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Collocation for solving DAEs with Singularities

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Contents

1 Collocation for DAEs

Collocation is a widely used and well-studied standard solution method for two-point boundary value problems, see for example [1] and the references therein. It also proved robust in case of singular boundary value problems in ODEs. Here, the convergence behavior of collocation schemes applied to approximate solutions of linear index 1 DAEs which exhibit a critical point at the left boundary is investigated. The critical point is of type 0 or type 1-A in the sense of [31] and [32]. Such a critical point of the DAE causes a singularity within the inherent, explicit ODE. We focus our attention on those DAEs which have an inherent, explicit ODE with a singularity of the first kind, apply polynomial collocation to the original DAE and consider different choices of the collocation points such as Gaussian points or Radau points. It turns out that the boundary conditions which are necessary and sufficient for the problem to be well-posed and to possess a unique solution which is at least continuous, depend not only on the type of the singularity present in the inherent, explicit ODE but also on the choice of the collocation points. The theoretical framework discussing the convergence behavior of the respective collocation schemes is now being developed, cf. [24], and so this research report on experimental results serves as illustration for the convergence theory.
Moreover, we present models exhibiting a singularity of the second kind and report the related numerical experiments as a basis for future studies.

1.1 Problem setting

We are going to examine the performance of the numerical schemes applied to a set of test problems specified below. The structure of the model problems we discuss is as follows:

$$A(t)(D(t)x(t))' + B(t)x(t) = g(t), \quad t \in (0,1], \tag{1.1}$$

where matrices $A(t) \in \mathbb{R}^{s\times n}$, and $D(t) \in \mathbb{R}^{n\times s}$ have full rank, $B(t) \in \mathbb{R}^{s\times s}$, and x, $g : [0,1] \to \mathbb{R}^s$. We assume that the DAE has the tractability index 1 for $t \in (0,1]$. Moreover, we investigate in some detail the structure of the DAE (1.1) in order to specify appropriate boundary conditions resulting in a well-posed analytical BVP which has a smooth solution.

All problems have been solved numerically by a test version of `sbvp2.0` or alternatively, by our new program `bvpsuite`. The final form of the above system used in computations with `sbvp2.0` was

$$\mathcal{A}(t)y'(t) + \mathcal{B}(t)y(t) = \mathfrak{g}(t), \quad t \in (0,1], \tag{1.2}$$

where $y(t) = (x(t), u(t))^T$, $u(t) := D(t)x(t)$ and

$$\mathcal{A}(t) = \begin{pmatrix} 0 & A \\ 0 & 0 \end{pmatrix}, \quad \mathcal{B}(t) = \begin{pmatrix} B & 0 \\ D & -I \end{pmatrix}, \quad \mathfrak{g}(t) = \begin{pmatrix} g(t) \\ 0 \end{pmatrix}.$$

The above substitution is carried out automatically: After specifying the matrices $A(t)$, $D(t)$, and $B(t)$, the system in form (1.2) is provided by the code.
When using the new code `bvpsuite`, the solution of the following augmented system is approximated:

$$A(t)u(t)' + B(t)x(t) = g(t), \quad t \in (0,1], \tag{1.3a}$$
$$D(t)x(t) = u(t). \tag{1.3b}$$

The additional boundary condition related to the substitution $u = Dx$ can have the general form

$$\alpha u(0) + \beta u(1) = \alpha Dx(0) + \beta Dx(1) \tag{1.4}$$

with arbitrary constants α and β.

For the theory in [24], we use two important assumptions, namely

$$tG_1^{-1}(t) \in C[0,1], \quad G_1^{-1}(t)g(t) \in C[0,1]. \tag{1.5}$$

They are sufficient for the stage order of the collocation scheme to hold. When they are violated, order reductions in the algebraic components may occur. Additional order reductions can be due to the behavior of the canonical projector $Q_{can}(t) := Q_0(t)G_1^{-1}(t)B(t)$ for $t \to 0$, especially when Q_{can} becomes unbounded in this limit.

1.2 Numerical Approach

In the scope of the original MATLAB code `sbvp2.0` are nonlinear BVPs for systems of explicit first order ODEs,

$$\begin{aligned} &u'(t) = F(t, u(t)), \quad t \in [0, 1], \\ &b(u(0), u(1)) = 0. \end{aligned}$$

The basic assumption is that the above BVP is well-posed and has an appropriately smooth solution u. The code `sbvp2.0` is a general purpose MATLAB code, cf. [5] and [21], which has already been successfully applied to a variety of problems, see for example [7], [12], [21], and [22]. The code `sbvp2.0` is capable to solve general first-order systems

$$F(t, u'(t), u(t)) = 0,$$

where linearity of f in u' and/or u is automatically used to provide an efficient numerical integrator.
Our new MATLAB code `bvpsuite` is designed to solve systems of differential equations of arbitrary order including zero, which means that algebraic constraints which do not involve derivatives are also permitted. Moreover, the problem may be given in a fully implicit form,

$$\begin{aligned} &F(t, u^{(4)}(t), u^{(3)}(t), u''(t), u'(t), u(t)) = 0, \quad 0 < t \leq 1, \\ &b(u^{(3)}(0), u''(0), u'(0), u(0), u^{(3)}(1), u''(1), u'(1), u(1)) = 0. \end{aligned}$$

The program can cope with free parameters, $\lambda_1, \lambda_2, \ldots, \lambda_k$, which will be computed along with the numerical approximation for u,

$$\begin{aligned} &F(t, u^{(4)}(t), u^{(3)}(t), u''(t), u'(t), u(t), \lambda_1, \lambda_2, \ldots, \lambda_k) = 0, \ 0 < t \leq 1, \\ &b_{aug}(u^{(3)}(0), u''(0), u'(0), u(0), u^{(3)}(1), u''(1), u'(1), u(1)) = 0. \end{aligned}$$

provided that the boundary conditions b_{aug} include k additional requirements to be satisfied by u.

The numerical approximation defined by collocation is computed as follows: On a mesh

$$\Delta := \{\tau_i : i = 0, \ldots, N\}, \quad 0 = \tau_0 < \tau_1 \cdots < \tau_N = 1$$

we approximate the analytical solution by a collocating function,

$$p(t) := p_i(t), \quad t \in [\tau_i, \tau_{i+1}], \quad i = 0, \ldots, N-1,$$

where we require $p \in C^{q-1}[0,1]$ in case that the order of the underlying differential equation is q. Here p_i are polynomials of maximal degree $m - 1 + q$ which satisfy the system (1.2) or (1.3) at the *collocation points*

$$\{t_{i,j} = \tau_i + \rho_j(\tau_{i+1} - \tau_i), \ i = 0, \ldots, N-1, \ j = 1, \ldots, m\}, \quad 0 < \rho_1 < \cdots < \rho_m < 1,$$

and the associated boundary conditions.

For $y \in \mathbb{R}^n$, $y = (y_1, \ldots, y_n)^T$, we use

$$|y|_\infty := \max_{1 \leq k \leq n} |y_k|$$

and for $y \in C[0,1]$, $y : [0,1] \to \mathbb{R}^n$,

$$|y(t)| := \max_{1 \leq k \leq n} |y_i(t)|,$$

and

$$\|y\|_\infty := \max_{0 \leq t \leq 1} |y(t)|.$$

Classical theory for regular problems, cf. [1], predicts that the global error of the method is at least $O(h^m)$, where h is the maximal stepsize, $h := \max_i(\tau_{i+1} - \tau_i)$. More precisely, for the global error of p, $\|p - u\|_\infty = O(h^m)$ holds uniformly in t. For certain choices of the collocation points the so-called *superconvergence* order can be observed. In case of the Gaussian points this means that the approximation is exceptionally precise at the meshpoints τ_i, $\max_{\tau_i \in \Delta} |p(\tau_i) - u(\tau_i)|_\infty = O(h^{2m})$.

To make the computations more efficient, an adaptive mesh selection strategy based on an a posteriori estimate for the global error of the collocation solution can be utilized. So far, the global error estimate is restricted to a classical h-$h/2$-strategy.
For the experiments, the collocation schemes have been executed with m equidistant and m Gaussian points, and as far as it was possible with m Radau points. The numerous tables in Chapter 3 are covering two problem classes and different orders of the collocation method. Problem Class 1 consists of fully implicit linear DAE systems of two equations and Problem Class 2 represents semi-explicit four dimensional DAE systems.

- In Tables 2 to 56 the numerical results for systems with *regular* inherent ODEs, Problem Class 1, with equidistant `e`, Gaussian `g`, and Radau `Radau` collocation points are discussed, cf. Section 2.2.
- In Tables 57 to 111 the numerical experiments for systems with singular inherent ODEs with a *singularity of the first kind*, Problem Class 1, are listed, cf. Section 2.3.
- In Tables 112 to 171 the numerical experiments for singular inherent ODEs with a *singularity of the second kind*, Problem Class 1, are reported, cf. Section 2.5.
- In Tables 172 to 236 the test runs for the semi-explicit linear problems with singular inherent ODE system, *singularity of the first kind*, Problem Class 2, equidistant, Gaussian and Radau points are discussed, cf. Section 2.6.

2 Numerical results

2.1 Problem Class 1 - setting and analytical properties

The system of DAEs in this problem class has the form

$$\begin{pmatrix} t^k \\ 1 \end{pmatrix} (x_1(t) + \alpha(t)x_2(t))' + \begin{pmatrix} t^k\beta(t) & -t^k\,\alpha'(t) \\ 0 & \gamma(t) - \alpha'(t) \end{pmatrix} x(t) = \begin{pmatrix} t^k g_1(t) \\ g_2(t) \end{pmatrix} =: g(t), \tag{2.1}$$

where $k \geq 0$. We stress that the first component of $g(t)$ is not $g_1(t)$ but $t^k g_1(t)$. Examples stated below are constructed in such a way that the inherent differential equation is regular or singular, with singularity of the first or of the second kind. This inherent ordinary differential equation for $u(t) := x_1(t) + \alpha(t)x_2(t)$ reads:

$$u'(t) = -\frac{\beta(t)(\gamma(t) - \alpha'(t))}{\varphi(t)}u(t) + \frac{1}{\varphi(t)}\Big((\gamma(t) - \alpha'(t))g_1(t) + (\alpha(t)\beta(t) + \alpha'(t))g_2(t)\Big), \tag{2.2}$$

where $\varphi(t) = \gamma(t) + \alpha(t)\beta(t)$. For the components x_1 and x_2 of the solution $x(t)$ we then have

$$\begin{aligned} x_1(t) &= \frac{\gamma(t)}{\varphi(t)}u(t) + \frac{\alpha(t)}{\varphi(t)}\Big(g_1(t) - g_2(t)\Big), \\ x_2(t) &= \frac{\beta(t)}{\varphi(t)}u(t) - \frac{1}{\varphi(t)}\Big(g_1(t) - g_2(t)\Big). \end{aligned} \tag{2.3}$$

The solution components x_1 and x_2 have to satisfy the consistency condition

$$\beta(t)x_1(t) - \gamma(t)x_2(t) = g_1(t) - g_2(t) \tag{2.4}$$

for any $t \in (0, 1]$.

We now discuss in more detail the data for the decoupling procedure of (2.1) which leads to (2.2) and the representation (2.3) of the solution of (2.1). With

$$A = \begin{pmatrix} t^k \\ 1 \end{pmatrix}, \quad D(t) = (\,1 \quad \alpha(t)\,), \quad B(t) = \begin{pmatrix} t^k\beta(t) & -t^k\alpha'(t) \\ 0 & \gamma(t) - \alpha'(t), \end{pmatrix},$$

we have, for notation and definitions see [24],

$$Q_0(t) = \begin{pmatrix} 0 & -\alpha(t) \\ 0 & 1 \end{pmatrix}, P_0(t) = \begin{pmatrix} 1 & \alpha(t) \\ 0 & 0 \end{pmatrix}, D^- = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, G_0(t) := AD(t) = \begin{pmatrix} t^k & t^k\alpha(t) \\ 1 & \alpha(t) \end{pmatrix}.$$

Moreover, since we assumed (2.1) to be an index 1 DAE, the matrix $G_1(t) = G_0(t) + B(t)Q_0(t)$ is nonsingular,

$$G_1(t) = \begin{pmatrix} t^k & t^k\alpha(t) \\ 1 & \alpha(t) \end{pmatrix} + \begin{pmatrix} t^k\beta(t) & -t^k\alpha'(t) \\ 0 & \gamma(t)-\alpha'(t) \end{pmatrix}\begin{pmatrix} 0 & -\alpha(t) \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} t^k & t^k(\alpha(t)-\alpha(t)\beta(t)-\alpha'(t)) \\ 1 & \alpha(t)+\gamma(t)-\alpha'(t) \end{pmatrix}.$$

Consequently, for $t \in (0,1]$, $\det G_1(t) = t^k(\gamma(t)+\alpha(t)\beta(t)) \neq 0$ and

$$G_1^{-1}(t) = \frac{1}{\alpha(t)\beta(t)+\gamma(t)} \begin{pmatrix} t^{-k}(\alpha(t)+\gamma(t)-\alpha'(t)) & -\alpha(t)+\alpha(t)\beta(t)+\alpha'(t) \\ -t^{-k} & 1 \end{pmatrix}. \tag{2.5}$$

Furthermore, we have

$$\begin{aligned} D(t)G_1^{-1}(t) &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} 1 & \alpha(t) \end{pmatrix}\begin{pmatrix} t^{-k}(\alpha(t)+\gamma(t)-\alpha'(t)) & -\alpha(t)+\alpha(t)\beta(t)+\alpha'(t) \\ -t^{-k} & 1 \end{pmatrix} \\ &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} t^{-k}(\gamma(t)-\alpha'(t)) & \alpha(t)\beta(t)+\alpha'(t) \end{pmatrix}, \end{aligned}$$

and

$$\begin{aligned} D(t)G_1^{-1}(t)B(t)D^-(t) &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} t^{-k}(\gamma(t)-\alpha'(t)) & \alpha(t)\beta(t)+\alpha'(t) \end{pmatrix}\begin{pmatrix} t^k\beta(t) \\ 0 \end{pmatrix} \\ &= \frac{\beta(t)(\gamma(t)-\alpha'(t))}{\alpha(t)\beta(t)+\gamma(t)}. \end{aligned}$$

The inherent ODE related to (2.1) now reads

$$u'(t) + D(t)G_1^{-1}(t)B(t)D^-(t)u(t) = D(t)G_1^{-1}(t)g(t),$$

or equivalently,

$$u'(t) + \frac{\beta(t)(\gamma(t)-\alpha'(t))}{\alpha(t)\beta(t)+\gamma(t)}u(t) = \frac{1}{\alpha(t)\beta(t)+\gamma(t)}((\gamma(t)-\alpha'(t))g_1(t) + (\alpha(t)\beta(t)+\alpha'(t))g_2(t)). \tag{2.6}$$

In order to specify x we need to calculate the canonical projector

$$\begin{aligned} Q_{can}(t) = Q_0(t)G_1^{-1}(t)B(t) &= \begin{pmatrix} 0 & -\alpha(t) \\ 0 & 1 \end{pmatrix}\frac{1}{\varphi(t)}\begin{pmatrix} \alpha(t)+\gamma(t)-\alpha'(t) & -\alpha(t)+\alpha(t)\beta(t)+\alpha'(t) \\ -1 & 1 \end{pmatrix} \\ &\quad\times\begin{pmatrix} \beta(t) & -\alpha'(t) \\ 0 & \gamma(t)-\alpha'(t) \end{pmatrix} \\ &= \frac{1}{\varphi(t)}\begin{pmatrix} \alpha(t) & -\alpha(t) \\ -1 & 1 \end{pmatrix}\begin{pmatrix} \beta(t) & -\alpha'(t) \\ 0 & \gamma(t)-\alpha'(t) \end{pmatrix} \\ &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} \alpha(t)\beta(t) & -\alpha(t)\gamma(t) \\ -\beta(t) & \gamma(t) \end{pmatrix}. \end{aligned} \tag{2.7}$$

$$\begin{aligned} Q_0(t)G_1^{-1}(t) &= \begin{pmatrix} 0 & -\alpha(t) \\ 0 & 1 \end{pmatrix}\frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} t^{-k}(\alpha(t)+\gamma(t)-\alpha'(t)) & -\alpha(t)+\alpha(t)\beta(t)+\alpha'(t) \\ -t^{-k} & 1 \end{pmatrix} \\ &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} t^{-k}\alpha(t) & -\alpha(t) \\ -t^{-k} & 1 \end{pmatrix}, \end{aligned}$$

and

$$\begin{aligned} P_{can1}(t) &= I - Q_0(t)G_1^{-1}(t)B(t) = \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} \alpha(t)\beta(t)+\gamma(t) & 0 \\ 0 & \alpha(t)\beta(t)+\gamma(t) \end{pmatrix} \\ &- \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} \alpha(t)\beta(t) & -\alpha(t)\gamma(t) \\ -\beta(t) & \gamma(t) \end{pmatrix} \\ &= \frac{1}{\alpha(t)\beta(t)+\gamma(t)}\begin{pmatrix} \gamma(t) & \alpha(t)\gamma(t) \\ \beta(t) & \alpha(t)\beta(t) \end{pmatrix}. \end{aligned}$$

Then, from $x(t) = P_{can1}(t)D^-(t)u(t) + Q_0(t)G_1^{-1}(t)g(t)$, we obtain an explicit formula

$$x(t) = \frac{1}{\alpha(t)\beta(t)+\gamma(t)} \begin{pmatrix} \gamma(t) \\ \beta(t) \end{pmatrix} u(t) + \frac{1}{\alpha(t)\beta(t)+\gamma(t)} \begin{pmatrix} \alpha(t)g_1(t) - \alpha(t)g_2(t) \\ -g_1(t) + g_2(t) \end{pmatrix} \tag{2.8}$$

for the solution x of the DAE (2.1).

2.2 Regular problems, $k = 0$

2.2.1 Models

Class 0.1: $\alpha(t) \equiv 0$

Problem 0.11
In this case $\varphi(t) = \gamma(t)$ and therefore the equation for u reads:

$$u'(t) = -\beta(t)u(t) + g_1(t).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0, 1]$ is equivalent to $\gamma(t) \neq 0$ for $t \in (0, 1]$. We set $\beta(t) = \cos t$, $\gamma(t) = e^t$ and $u(t) = \cos t$. Then

$$u'(t) = -\cos t\, u(t) + g_1(t)$$

and $g_1(t) = -\sin t + \cos^2 t$ follows. Moreover, choose $g_2(t) = -e^{2t}$. Then we have:
Solution:

$$x_1(t) = u(t) = \cos t, \quad x_2(t) = \frac{1}{e^t}\Big(\sin t - e^{2t}\Big).$$

System of DAEs:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t))' + \begin{pmatrix} \cos t & 0 \\ 0 & e^t \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} -\sin t + \cos^2 t \\ -e^{2t} \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss collocation[1]:

$$x_1(0) = 1, \quad \cos 1\, x_1(1) - e^1\, x_2(1) = -\sin 1 + \cos^2 1 + e^2.$$

See Tables 2 to 6 for the numerical results.
Boundary conditions (roswitha) for Gauss and Radau collocation:

$$x_1(0) - x_2(0) = 2, \quad x_1(1) = \cos 1.$$

See Tables 7 to 11 for the numerical results.

Class 0.2: $\alpha'(t) \equiv 0$

Problem 0.21
We choose $\alpha(t) \equiv -1$. In this case $\varphi(t) = \gamma(t) - \beta(t)$. With $\gamma(t) = t^2$ and $\beta(t) = t^2 - 1$, we obtain $\varphi(t) = 1$, and the equation for u reads:

$$u'(t) = -\beta(t)\gamma(t)u(t) + \Big(\gamma(t)g_1(t) + \alpha(t)\beta(t)g_2(t)\Big),$$

$$u'(t) = -(t^2-1)t^2u(t) + t^2g_1(t) - (t^2-1)g_2(t).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0, 1]$ is equivalent to $\gamma(t) - \beta(t) = 1 \neq 0$ for $t \in (0, 1]$. Choose $u(t) = \cosh t$ and $g_1(t) = g_2(t)$. Then $g_1(t) = g_2(t) = \sinh t + (t^2-1)t^2 \cosh t$, follows. Finally we obtain:
Solution:

$$x_1(t) = \gamma(t)u(t) = t^2 \cosh t, \quad x_2(t) = \beta(t)u(t) = (t^2-1)\cosh t.$$

[1] Note that the second boundary condition is consistent with the algebraic equation for $x_2(t)$,

$$x_1'(t) + e^t x_2(t) = -e^{2t}$$

at $t = 1$,

$$-\sin 1 + e^1 x_2(1) = -e^2 \Leftrightarrow -e^1 x_2(1) = -\sin 1 + e^2$$

since $x_1(1) = \cos 1$.

System of DAEs:

$$\begin{aligned}\begin{pmatrix}1\\1\end{pmatrix}(x_1(t)-x_2(t))' + \begin{pmatrix}t^2-1 & 0\\ 0 & t^2\end{pmatrix}x(t) &= \begin{pmatrix}g_1(t)\\ g_1(t)\end{pmatrix}\\ &= \begin{pmatrix}\sinh t + (t^2-1)t^2\cosh t\\ \sinh t + (t^2-1)t^2\cosh t\end{pmatrix}.\end{aligned}$$

Boundary conditions (ewa) for Gauss collocation[2]**:**

$$x_1(0)+x_2(0)=-1, \quad x_2(1)=0.$$

See Tables 12 to 16 for the numerical results.
Boundary conditions (roswitha) for Gauss and Radau collocation:

$$x_1(0)=0, \quad x_1(1)-x_2(1)=\cosh 1.$$

See Tables 17 to 21 for the numerical results.

Class 0.3: $\beta \equiv 0$

Problem 0.31
In this case $\varphi(t)=\gamma(t)$. With $\gamma(t)=e^t$ and $\alpha(t)=\sin t$, we have $\alpha'(t)=\cos t$ and $\varphi(t)=e^t$. The equation for u reads:

$$\begin{aligned}u'(t) &= \frac{1}{\gamma(t)}\Big((\gamma(t)-\alpha'(t))g_1(t)+\alpha'(t)g_2(t)\Big),\\ u'(t) &= \frac{1}{e^t}\Big((e^t-\cos t)g_1(t)+\cos t\, g_2(t)\Big).\end{aligned}$$

The requirement $\varphi(t)\neq 0$ for $t\in(0,1]$ is equivalent to $\gamma(t)=e^t\neq 0$ for $t\in(0,1]$. Choose $u(t)=t^5\ln t$ and $g_1(t)\equiv 1$. Then

$$g_2(t)=\frac{t^4e^t(5\ln t+1)+\cos t-e^t}{\cos t}$$

follows. Finally we obtain:
Solution:

$$\begin{aligned}x_1(t) &= u(t)+\frac{\alpha(t)}{\gamma(t)}\Big(g_1(t)-g_2(t)\Big) = t^5\ln t+\frac{\sin t}{e^t}\Big(\frac{-t^4e^t(5\ln t+1)+e^t}{\cos t}\Big),\\ x_2(t) &= -\frac{1}{\gamma(t)}\Big(g_1(t)-g_2(t)\Big) = \frac{t^4(5\ln t+1)-1}{\cos t}.\end{aligned}$$

Note that $x(t)$ is only in $C^3[0,1]$ and $u(t)=x_1(t)+\alpha(t)\,x_2(t)=x_1(t)+\sin t\, x_2(t)$ in $C^4[0,1]$.

System of DAEs:

$$\begin{aligned}\begin{pmatrix}1\\1\end{pmatrix}(x_1(t)+\sin t\, x_2(t))' + \begin{pmatrix}0 & -\cos t\\ 0 & e^t-\cos t\end{pmatrix}x(t) &= \begin{pmatrix}g_1(t)\\ g_2(t)\end{pmatrix}\\ &= \begin{pmatrix}1\\ \frac{t^4e^t(5\ln t+1)+\cos t-e^t}{\cos t}\end{pmatrix}.\end{aligned}$$

Problem 0.311
Boundary conditions (ewa) for Gauss collocation:

$$x_1(0)+x_2(1)=0, \quad x_2(1)=0.$$

[2]Note that the second boundary condition is consistent with the algebraic equation for $x_2(t)$,

$$x_1'(t)-x_2'(t)+t^2x_2(t)=\sinh t+(t^2-1)t^2\cosh t$$

at $t=1$,

$$\cosh' 1 + x_2(1) = \sinh 1.$$

See Tables 22 to 26 for the numerical results.
Boundary conditions (roswitha) for Gauss and Radau collocation:

$$x_2(0) = -1, \quad x_1(1) = 0.$$

See Tables 27 to 31 for the numerical results.
Problem 0.312
Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) = 0, \quad x_2(1) = 0.$$

See Tables 32 to 36 for the numerical results.
Problem 0.313[3]
Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) + x_2(0) = -1, \quad x_2(1) = 0.$$

See Tables 37 to 41 for the numerical results.
Note that $x(t)$ and also $u(t) = x_1(t) + \alpha(t)\, x_2(t) = x_1(t) + \sin t\, x_2(t)$ are only in $C^4[0,1] \cap C^\infty(0,1]$.

Class 0.4: $\gamma \equiv 0$

Problem 0.41
We choose $\alpha(t) = \cos t$ and $\beta(t) = \cosh t$. This means that $\alpha'(t) = -\sin t$. Also, $\varphi(t) = \alpha(t)\beta(t) = \cos t \cosh t$ and the equation for u reads:

$$u'(t) = \frac{\alpha'(t)}{\alpha(t)} u(t) + \frac{1}{\alpha(t)\beta(t)} \Big(-\alpha'(t) g_1(t) + (\alpha(t)\beta(t) + \alpha'(t)) g_2(t) \Big),$$

$$u'(t) = -\tan t\, u(t) + \frac{1}{\cos t \cosh t} \Big(\sin t\, g_1(t) + (\cos t \cosh t - \sin t) g_2(t) \Big).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0,1]$ is equivalent to the condition $\alpha(t)\beta(t) = \cos t \cosh t \neq 0$ for $t \in (0,1]$.

Problem 0.411
Choose $u(t) = \sin 10t$ and $g_1(t) = g_2(t)$. Then, $g_1(t) = g_2(t) = 10 \cos 10t + \tan t \sin 10t$. Moreover we obtain:
Solution:

$$x_1(t) \equiv 0, \quad x_2(t) = \frac{1}{\alpha(t)} u(t) = \frac{\sin 10t}{\cos t}.$$

System of DAEs:

$$\begin{aligned} \begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + \cos t\, x_2(t))' \quad &+ \quad \begin{pmatrix} \cosh t & \sin t \\ 0 & \sin t \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_1(t) \end{pmatrix} \\ &= \begin{pmatrix} 10 \cos 10t + \tan t \sin 10t \\ 10 \cos 10t + \tan t \sin 10t \end{pmatrix}. \end{aligned}$$

Boundary conditions (ewa)[4] **for Gauss and Radau collocation:**

$$x_2(1) = \frac{\sin 10}{\cos 1}, \quad x_1(0) = 0.$$

[3] Note that the second boundary condition is consistent with the algebraic equation for $x_2(t)$,

$$(x_1(t) + \alpha(t)\, x_2(t))' + (\gamma(t) - \alpha'(t)) x_2(t) = g_2(t) \;\Leftrightarrow$$

$$(t^5 \ln t)' + (e^t - \cos t)\, x_2(t) = \frac{t^4 e^t (5 \ln t + 1) + \cos t - e^t}{\cos t}$$

at $t = 1$,

$$1 + (e^1 - \cos 1)\, x_2(1) = 1 \;\Leftrightarrow\; x_2(1) = 0.$$

[4] Note that here the first boundary condition (which simply prescribes the value of $x_2(t)$ at $t = 1$) is consistent with the algebraic equation for $x_2(t)$, $(x_1(t) + \cos t\, x_2(t))' + \sin t\ x_2(t) = 10 \cos 10t + \tan t \sin 10t$ at $t = 1$, i.e. $10 \cos 10 + \sin 1 x_2(1) = 10 \cos 10 + \frac{\sin 1}{\cos 1} \sin 10 \;\Leftrightarrow$ $x_2(1) = \frac{\sin 10}{\cos 1}$.
The second boundary condition is not only obvious, since $x_1(t) \equiv 0$, but it is also equivalent to $\beta(0) x_1(0) - \gamma(0) x_2(0) = g_1(0) - g_2(0) \;\Leftrightarrow$

See Tables 42 to 46 for the numerical results.

Problem 0.412
Choose $u(t) = \cos t$ and $g_1(t) = \cos t \cosh t - \sin t$. Then $g_2(t) = -\sin t$. Moreover we obtain:
Solution:

$$x_1(t) = \frac{1}{\beta(t)}\Big(g_1(t) - g_2(t)\Big) = \cos t$$

and

$$x_2(t) = \frac{1}{\alpha(t)}u(t) - \frac{1}{\alpha(t)\beta(t)}\Big(g_1(t) - g_2(t)\Big) = \frac{\cos t}{\cos t} - \frac{\cos t \cosh t}{\cos t \cosh t} = 0.$$

System of DAEs:

$$\begin{aligned}\begin{pmatrix} 1 \\ 1 \end{pmatrix}(x_1(t) + \cos t\, x_2(t))' \quad + \quad & \begin{pmatrix} \cosh t & \sin t \\ 0 & \sin t \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\ = \quad & \begin{pmatrix} \cos t \cosh t - \sin t \\ -\sin t \end{pmatrix}.\end{aligned}$$

Boundary conditions (ewa)[5] for Gauss and Radau collocation:

$$x_1(0) = 1, \quad x_2(1) = 0.$$

See Tables 47 to 51 for the numerical results.

Problem 0.413
Choose $u(t) = \cos^2 t$ and $g_1(t) = -\cos^2 t \cosh t$. Then $g_2(t) \equiv 0$. Moreover we obtain:
Solution:

$$x_1(t) = \frac{1}{\beta(t)}\Big(g_1(t) - g_2(t)\Big) = -\cos^2 t$$

and

$$x_2(t) = \frac{1}{\alpha(t)}u(t) - \frac{1}{\alpha(t)\beta(t)}\Big(g_1(t) - g_2(t)\Big) = \cos t - \frac{-\cos^2 t \cosh t}{\cos t \cosh t} = 2\cos t.$$

System of DAEs:

$$\begin{aligned}\begin{pmatrix} 1 \\ 1 \end{pmatrix}(x_1(t) + \cos t\, x_2(t))' \quad + \quad & \begin{pmatrix} \cosh t & \sin t \\ 0 & \sin t \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\ = \quad & \begin{pmatrix} -\cos^2 t \cosh t \\ 0 \end{pmatrix}.\end{aligned}$$

Boundary conditions (ewa)[6] for Gauss and Radau collocation:

$$x_1(0) = -1, \;\; x_2(1) = 2\cos 1.$$

$\cosh 0\, x_1(0) = 0$. In this case boundary conditions could also be posed as

$$x_2(1) = \frac{\sin 10}{\cos 1}, \quad x_1(1) = 0,$$

since $\beta(1)x_1(1) - \gamma(1)x_2(1) = g_1(1) - g_2(1) \;\Leftrightarrow\; \cosh 1\, x_1(1) = 0$. In this case the boundary value problem would degenerate to an initial value problem to be solved from $t = 1$ to $t = 0$.

[5] Note that $\gamma(t) \equiv 0$ implies that the boundary condition derived from $\beta(t)x_1(t) - \gamma(t)x_2(t) = g_1(t) - g_2(t)$ can only be posed for either $x_1(0)$ or $x_1(1)$. Let $t = 0$, then $\cosh 0\, x_1(0) = g_1(0) - g_2(0) \;\Leftrightarrow\; x_1(0) = 1$. For $t = 1$ we would obtain $\cosh 1\, x_1(1) = g_1(1) - g_2(1) \;\Leftrightarrow\; x_1(1) = \cos 1$ which is consistent with the expression for $x_1(t)$. Consider the algebraic equation for $x_2(t)$, $(x_1(t) + \cos t\, x_2(t))' + \sin t\; x_2(t) = -\sin t$ at $t = 1$, i.e. $-\sin 1 + \sin 1 x_2(1) = -\sin 1 \;\Leftrightarrow\; x_2(1) = 0$. This is consistent with the expression for $x_2(t)$.
The boundary conditions could also be posed as

$$x_1(1) = \cos 1, \quad x_2(1) = 0.$$

In this case the boundary value problem degenerates to an initial value problem to be solved from $t = 1$ to $t = 0$.

[6] Note that $\gamma(t) \equiv 0$ implies that the boundary condition derived from $\beta(t)x_1(t) - \gamma(t)x_2(t) = g_1(t) - g_2(t)$ can only be posed for either $x_1(0)$ or $x_1(1)$. Let $t = 0$, then $\cosh 0\, x_1(0) = g_1(0) - g_2(0) \;\Leftrightarrow\; x_1(0) = -1$. For $t = 1$ we would obtain $\cosh 1\, x_1(1) = g_1(1) - g_2(1) = -\cos^2 1 \cosh 1 \;\Leftrightarrow\; x_1(1) = -\cos^2 1$ which is consistent with the expression for $x_1(t)$. Consider the algebraic equation for $x_2(t)$, $(x_1(t) + \cos t\, x_2(t))' + \sin t\; x_2(t) = 0$ at $t = 1$, i.e. $-2\cos 1 \sin 1 + \sin 1 x_2(1) = 0 \Leftrightarrow x_2(1) = 2\cos 1$. This is consistent with the expression

See Tables 52 to 56 for the numerical results.
Boundary conditions (roswitha):

$$x_1(0) = -1, \;\; x_1(1) + \cos 1 x_2(1) = \cos^2 1.$$

No numerical results available.
We now recapitulate the presently available numerical results for this class of models.

2.2.2 Convergence results

We have calculated numerical solutions to problems 0.11, 0.21, 0.311, 0.312, 0.313, 0.411, 0.412, and 0.413 with boundary conditions *ewa* and additionally, problems 0.11, 0.21, and 0.311 with boundary conditions *roswitha*. We now describe the convergence behavior of the quantities $gex_{\text{tau}} := \|p - x\|_{\text{tau}}$, $gex_{\text{tcol}} := \|p - x\|_{\text{tcol}}$, $geu_{\text{tau}} : \|q - u\|_{\text{tau}}$, $geu_{\text{tcol}} := \|q - u\|_{\text{tcol}}$, where q is a numerical approximation for u. The first two expressions are the maximal values of the global errors of the solution x in the mesh points only (tau)[7] and in all grid points including τ_i and collocation points $t_{i,j}$, (tcol), respectively. The second two expressions are the respective global errors for the differential solution component u.

According to Tables 2 to 56, for appropriately smooth solution x we observe the following convergence behavior for equidistant collocation points:

$$gex_{\text{tau}} = O(h^m),\, gex_{\text{tcol}} = O(h^m),\, geu_{\text{tau}} = O(h^m),\, geu_{\text{tcol}} = O(h^m),$$

for m even and

$$gex_{\text{tau}} = O(h^{m+1}),\, gex_{\text{tcol}} = O(h^{m+1}),\, geu_{\text{tau}} = O(h^{m+1}),\, geu_{\text{tcol}} = O(h^{m+1}),$$

for m odd. For Gaussian points this result cannot be improved in general, the superconvergence cannot be expected to hold, see Problem 0.21, Tables 12 to 16. Clearly, when the solution of the problem is not sufficiently smooth, corresponding order reductions are observed, in line with classical collocation theory [1], cf. Tables 26 and 31 for Problem 0.311.

In Tables 42 to 56 smooth solutions to Problems 0.411, 0412 and 0.412 with Radau points and boundary conditions *ewa* could be computed. Here, for all m, the superconvergence for

$$gex_{\text{tau}} = O(h^{2m-1}),\, geu_{\text{tau}} = O(h^{2m-1})$$

is observed, and the uniform convergence behavior is

$$gex_{\text{tcol}} = O(h^{m+1}),\, geu_{\text{tcol}} = O(h^{m+1}),$$

for all values of m, except for the case $m = 1$, corresponding to the backward Euler rule showing its expected convergence order.

For Radau points and boundary conditions *roswitha*, the same results can be observed in Tables 7 to 11 and 27 to 31 for Problems 0.11 and 0.21 (smooth solution), respectively.

2.3 Singularity of the first kind – smooth solution x

It is important to note that the sign of the term

$$-\frac{\beta(t)(\gamma(t) - \alpha'(t))}{\varphi(t)},$$

for $x_2(t)$.
The boundary conditions could also be posed as

$$x_1(1) = -\cos^2 1, \;\; x_2(1) = 2\cos 1.$$

In this case the boundary value problem degenerates to an initial value problem to be solved from $t = 1$ to $t = 0$.

[7] cf. the definition of Δ on page 3.

cf. (2.2), with $\beta(t)(\gamma(t) - \alpha'(t))$ evaluated at $t = 0$, is crucial and decides about the boundary condition necessary for the solution u (and x) to be at least in $C[0, 1]$. Moreover, it turns out that for our model class it is, for different reasons, difficult to prescribe the correct set of boundary conditions for Radau collocation. This is mainly due to the fact that because of the singularity certain continuity conditions necessarily need to be specified at $t = 0$. In such a case it may happen that the consistency condition (2.4) is identical with the continuity condition at $t = 0$, which therefore needs to be prescribed at $t = 1$ instead. However, in that case it is linearly dependent with the collocation equation for the Radau point $t = 1$.

2.3.1 Models

Class 1.1: $\alpha(t) \equiv 0,\ k = 1$

Problem 1.11
In this case $\varphi(t) = \gamma(t)$ and therefore the equation for u reads:

$$u'(t) = -\beta(t)u(t) + g_1(t).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0, 1]$ is equivalent to $\gamma(t) \neq 0$ for $t \in (0, 1]$. Choose $\beta(t) = \frac{1}{t}$, $\gamma(t) = \cos t$ and $u(t) = t \sin t$. Then

$$u'(t) = -\frac{1}{t}\, u(t) + g_1(t)$$

and $g_1(t) = 2 \sin t + t \cos t$ follows. Moreover, choose $g_2(t) = -\, e^{2t}$. Then we have:
Solution:

$$x_1(t) = u(t) = t \sin t,\ \ x_2(t) = -\frac{\sin t + t \cos t + e^{2t}}{\cos t}.$$

System of DAEs:

$$\begin{pmatrix} t \\ 1 \end{pmatrix} (x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & \cos t \end{pmatrix} x(t) = \begin{pmatrix} t g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t(2 \sin t + t \cos t) \\ -\, e^{2t} \end{pmatrix}.$$

Boundary conditions (ewa)[8] for Gauss collocation:

$$x_1(0) = 0,\ \ x_1(1) - \cos 1\, x_2(1) = 2 \sin 1 + \cos 1 + e^2.$$

This BVP does not permit the application of the Radau scheme. Because of the singularity, we have to impose the continuity condition $x_1(0) = 0$. This condition is now identical with the new consistency condition

$$\beta(t)x_1(t) - t\gamma(t)x_2(t) = t g_1(t) - t g_2(t) \ \Leftrightarrow\ x_1(0) = 0$$

posed at $t = 0$.

The condition (1.5) is satisfied. To see this, since $A(t)$ is not constant, we need to calculate G_1^{-1} and all other involved quantities directly. From

$$A = \begin{pmatrix} t \\ 1 \end{pmatrix},\quad D(t) = \begin{pmatrix} 1 & 0 \end{pmatrix},\quad B(t) = \begin{pmatrix} 1 & 0 \\ 0 & \cos t \end{pmatrix},\quad g(t) = \begin{pmatrix} 2t \sin t + t^2 \cos t \\ -e^{2t} \end{pmatrix}$$

we have

$$Q_0(t) = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix},\quad D^- = \begin{pmatrix} 1 \\ 0 \end{pmatrix},\quad G_0(t) = \begin{pmatrix} t & 0 \\ 1 & 0 \end{pmatrix},$$

and

$$G_1(t) = G_0(t) + B(t)Q_0(t) = \begin{pmatrix} t & 0 \\ 1 & 0 \end{pmatrix} + \begin{pmatrix} 1 & 0 \\ 0 & \cos t \end{pmatrix} \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} t & 0 \\ 1 & \cos t \end{pmatrix}.$$

[8] It is important to note that

$$\lim_{t \to 0} \Big(-\frac{1}{t}\Big) = \lim_{t \to 0} \Big(\frac{\lambda}{t}\Big),\ \ \lambda < 0$$

and therefore we need to require that $u(0) = x_1(0) = 0$ holds. The second boundary condition, originating from $\beta(1)x_1(1) - \gamma(1)x_2(1) = g_1(1) - g_2(1)$, is consistent with the algebraic equation for $x_2(t)$, $x_1'(t) + \cos t x_2(t) = -e^{2t}$ at $t = 1$, $\sin 1 + \cos 1 + \cos 1\, x_2(1) = -e^2 \Leftrightarrow -\cos 1\, x_2(1) = \sin 1 + \cos 1 + e^2$, since $x_1(1) = \sin 1$.

Clearly,

$$G_1^{-1}(t) = \frac{1}{t\cos t}\begin{pmatrix} \cos t & 0 \\ -1 & t \end{pmatrix}, \quad tG_1^{-1}(t) = \frac{1}{\cos t}\begin{pmatrix} \cos t & 0 \\ -1 & t \end{pmatrix},$$

and

$$G_1^{-1}(t)g(t) = \frac{1}{t\cos t}\begin{pmatrix} \cos t & 0 \\ -1 & t \end{pmatrix}\begin{pmatrix} 2t\sin t + t^2\cos t \\ -e^{2t} \end{pmatrix} = \frac{1}{t\cos t}\begin{pmatrix} (2t\sin t + t^2\cos t)\cos t \\ -(2t\sin t + t^2\cos t) - te^{2t} \end{pmatrix}.$$

Moreover, the canonical projector (2.7) reads

$$Q_{can}(t) = \begin{pmatrix} 0 & 0 \\ \frac{-1}{t\cos t} & 1 \end{pmatrix} = O\left(\frac{1}{t}\right).$$

See Tables 57 to 61 for the numerical results.

Class 1.2: $\alpha'(t) \equiv 0$, $k = 0$

Problem 1.21

We choose $\alpha(t) \equiv -1$. In this case $\varphi(t) = \gamma(t) - \beta(t)$. With $\gamma(t) = \sin t$ and $\beta(t) = t$, we obtain $\varphi(t) = \sin t - t$ and the equation for u reads:

$$u'(t) = -\frac{\beta(t)\gamma(t)}{\gamma(t) - \beta(t)}u(t) + \frac{1}{\gamma(t) - \beta(t)}\Big(\gamma(t)g_1(t) + \alpha(t)\beta(t)g_2(t)\Big),$$

$$u'(t) = -\frac{t\sin t}{\sin t - t}\,u(t) + \frac{1}{\sin t - t}\Big(\sin t\, g_1(t) - t\, g_2(t)\Big).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0,1]$ is satisfied because $\gamma(t)-\beta(t) = \sin t - t \neq 0$ for $t \in (0,1]$. Choose $u(t) = t - \sin t$ and $g_1(t) = g_2(t)$. Then

$$g_1(t) = g_2(t) = 1 - \cos t - t\sin t$$

follows. Finally we obtain:

Solution:

$$x_1(t) = \frac{\gamma(t)}{\gamma(t) - \beta(t)}u(t) = \frac{\sin t}{\sin t - t}\Big(t - \sin t\Big) = -\sin t$$

and

$$x_2(t) = \frac{\beta(t)}{\gamma(t) - \beta(t)}u(t) = -t.$$

System of DAEs:

$$\begin{aligned} \begin{pmatrix} 1 \\ 1 \end{pmatrix}(x_1(t) - x_2(t))' + \begin{pmatrix} t & 0 \\ 0 & \sin t \end{pmatrix}x(t) &= \begin{pmatrix} g_1(t) \\ g_1(t) \end{pmatrix} \\ &= \begin{pmatrix} 1 - \cos t - t\sin t \\ 1 - \cos t - t\sin t \end{pmatrix}. \end{aligned}$$

Boundary conditions (ewa) for Gauss collocation[9]:

$$x_1(1) - x_2(1) = -\sin 1 + 1, \quad x_1(1) - \sin 1 x_2(1) = 0 \Leftrightarrow x_2(1) = -1.$$

This problem must be treated as an initial value problem from right ($t = 1$) to left ($t = 0$).
Note that the Problem 1.21 cannot be solved using Radau collocation. Since $B(0) = 0$, the consistency condition (2.4) needs to be prescribed at $t = 1$, where it coincides with the collocation equation.

[9] It is important to note that

$$\lim_{t\to 0}\Big(-\frac{t\sin t}{\sin t - t}\Big) = \lim_{t\to 0}\Big(\frac{2}{t}\Big) = \lim_{t\to 0}\Big(\frac{\lambda}{t}\Big), \;\; \lambda > 0$$

and therefore we need to prescribe the value of $u(1) = x_1(1) - x_2(1)$. Also, note that the second boundary condition is consistent with the algebraic equation for $x_2(t)$, $x_1'(t) - x_2'(t) + \sin t x_2(t) = 1 - \cos t - t$ at $t = 1$, $1 - \cos 1 + \sin 1\, x_2(1) = 1 - \cos 1 - \sin 1 \Leftrightarrow x_2(1) = -1$.

The condition (1.5) is not satisfied. From

$$\alpha(t) = -1, \quad \gamma(t) = \sin t, \quad \beta(t) = t, \quad \alpha(t)\beta(t) + \gamma(t) = \sin t - t,$$

and (2.5), it follows

$$G_1^{-1}(t) = \frac{1}{\sin t - t} \begin{pmatrix} \sin t - 1 & 1 - t \\ -1 & 1 \end{pmatrix}.$$

Hence,

$$G_1^{-1}(t) = O\left(\frac{1}{t^3}\right) \;\Rightarrow\; tG_1^{-1}(t) = O\left(\frac{1}{t^2}\right).$$

However,

$$G_1^{-1}(t)g(t) = \frac{1}{\sin t - t} \begin{pmatrix} \sin t - 1 & 1 - t \\ -1 & 1 \end{pmatrix} \begin{pmatrix} 1 - \cos t - t\sin t \\ 1 - \cos t - t\sin t \end{pmatrix} = \begin{pmatrix} 1 - \cos t - t\sin t \\ 0 \end{pmatrix}.$$

Here, the canonical projector (2.7) has the form

$$Q_{can}(t) = \begin{pmatrix} -\frac{t}{\sin t - t} & \frac{\sin t}{\sin t - t} \\ -\frac{t}{\sin t - t} & \frac{\sin t}{\sin t - t} \end{pmatrix} = O\left(\frac{1}{t^2}\right).$$

See Tables 62 to 66 for the numerical results obtained by `sbvp2.0` and Tables 67 to 71 for analogous results provided by `bvpsuite`.

Problem 1.22
We again choose $\alpha(t) \equiv -1$, whence $\varphi(t) = \gamma(t) - \beta(t)$. With $\gamma(t) = t + 2$ and $\beta(t) = 2$, we obtain $\varphi(t) = t$ and the equation for u reads:

$$u'(t) = -\frac{\beta(t)\gamma(t)}{\gamma(t) - \beta(t)} u(t) + \frac{1}{\gamma(t) - \beta(t)} \Big(\gamma(t)g_1(t) + \alpha(t)\beta(t)g_2(t)\Big),$$

$$u'(t) = -\frac{2(t+2)}{t}\, u(t) + \frac{1}{t}\Big((t+2)\, g_1(t) - 2\, g_2(t)\Big).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0, 1]$ is satisfied because $\gamma(t) - \beta(t) = t \neq 0$ for $t \in (0, 1]$. Choose $u(t) = te^{5t}$ and $g_1(t) = -\,te^{5t}$. Then

$$g_2(t) = -\frac{8t + 7}{2}\, te^{5t}.$$

Finally we obtain:
Solution:

$$x_1(t) = \frac{\gamma(t)}{\gamma(t) - \beta(t)}\, u(t) + \frac{\alpha(t)}{\gamma(t) - \beta(t)} \Big(g_1(t) - g_2(t)\Big) = -\frac{6t + 1}{2}\, e^{5t}$$

and

$$x_2(t) = \frac{\beta(t)}{\gamma(t) - \beta(t)} u(t) - \frac{1}{\gamma(t) - \beta(t)} \Big(g_1(t) - g_2(t)\Big) = -\frac{8t + 1}{2}\, e^{5t}.$$

System of DAEs:

$$\begin{aligned} \begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) - x_2(t))' + \begin{pmatrix} 2 & 0 \\ 0 & t + 2 \end{pmatrix} x(t) \;&=\; \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\ &=\; \begin{pmatrix} -\,te^{5t} \\ -\,\frac{8t+7}{2}\, te^{5t} \end{pmatrix}. \end{aligned}$$

Boundary conditions (ewa) for Gauss collocation[10]:

$$x_1(0) - x_2(0) = 0, \quad 2x_1(1) - 3x_2(1) = 6.5e^5.$$

[10] Here,

$$\lim_{t\to 0}\Big(-\frac{2(t+2)}{t}\Big) = \lim_{t\to 0}\Big(-\frac{4}{t}\Big) = \lim_{t\to 0}\Big(\frac{\lambda}{t}\Big), \;\; \lambda < 0$$

and therefore we need to prescribe the value of $u(0) = x_1(0) - x_2(0)$. Also, note that the second boundary condition is consistent with the algebraic equation for $x_2(t)$, $x_1'(t) - x_2'(t) + (t + 2)x_2(t) = -(8t + 7)/2\, te^{5t}$ at $t = 1$, $e^5 + 5e^5 + 3\, x_2(1) = -7.5e^5 \;\Leftrightarrow\; -3\, x_2(1) = 13.5e^5$.

For this example the condition (1.5) is again satisfied. From

$$\alpha(t) = -1, \quad \gamma(t) = t+2, \quad \beta(t) = 2, \quad \alpha(t)\beta(t) + \gamma(t) = t,$$

and (2.5), we obtain

$$G_1^{-1}(t) = \frac{1}{t}\begin{pmatrix} t+1 & -1 \\ -1 & 1 \end{pmatrix}.$$

Hence,

$$G_1^{-1}(t) = O\left(\frac{1}{t}\right) \quad \Rightarrow \quad tG_1^{-1}(t) = O\left(1\right).$$

Moreover,

$$G_1^{-1}(t)g(t) = \frac{1}{t}\begin{pmatrix} t+1 & -1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} -te^{5t} \\ -\frac{8t+7}{2}te^{5t} \end{pmatrix} = \begin{pmatrix} t+1 & -1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} -e^{5t} \\ -\frac{8t+7}{2}e^{5t} \end{pmatrix} \in C[0,1].$$

The associated canonical projector (2.7) is

$$Q_{can}(t) = \begin{pmatrix} -\frac{2}{t} & \frac{2+t}{t} \\ -\frac{2}{t} & \frac{2+t}{t} \end{pmatrix} = O\left(\frac{1}{t}\right).$$

See Tables 72 to 76 for the numerical results.
Boundary conditions (roswitha) for Radau collocation:

$$x_1(0) - x_2(0) = 0, \quad x_1(0) - x_2(0) = \frac{1}{2}.$$

Radau collocation did work with this set of conditions (roswitha). Note that the second condition is equivalent to (2.4) formulated at $t = 0$. No numerical results are given in this report.

Class 1.3: $\gamma \equiv 0$, $k = 1$

Problem 1.31
We choose $\alpha(t) = t^2$ and $\beta(t) = \frac{1}{t}$. This means that $\alpha'(t) = 2t$. Also, $\varphi(t) = \alpha(t)\beta(t) = t$ and the equation for u reads:

$$u'(t) = \frac{\alpha'(t)}{\alpha(t)}u(t) + \frac{1}{\alpha(t)\beta(t)}\Big(-\alpha'(t)g_1(t) + (\alpha(t)\beta(t) + \alpha'(t))g_2(t)\Big),$$

$$u'(t) = \frac{2}{t}\,u(t) + \frac{1}{t}\Big(-2t\,g_1(t) + (t+2t)g_2(t)\Big) = \frac{2}{t}\,u(t) - 2\,g_1(t) + 3\,g_2(t).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0,1]$ is equivalent to the condition $\alpha(t)\beta(t) = t \neq 0$ for $t \in (0,1]$. Choose $u(t) = t^2 - \cos t + 1$ and $g_1(t) = -\frac{\sin t}{2}$. Then

$$g_2(t) = \frac{2}{3t}\Big(\cos t - 1\Big).$$

Moreover we obtain:
Solution:

$$x_1(t) = \frac{1}{\beta(t)}\Big(g_1(t) - g_2(t)\Big) = -\Big(\frac{t\sin t}{2} + \frac{2}{3}\Big(\cos t - 1\Big)\Big)$$

and

$$x_2(t) = \frac{u(t)}{\alpha(t)} - \frac{1}{\alpha(t)\beta(t)}\Big(g_1(t) - g_2(t)\Big) = \frac{t^2 - \cos t + 1}{t^2} + \frac{\sin t}{2t} + \frac{2}{3t^2}\Big(\cos t - 1\Big).$$

System of DAEs:

$$\begin{aligned}\begin{pmatrix} t \\ 1 \end{pmatrix}(x_1(t) + t^2\,x_2(t))' \quad &+ \quad \begin{pmatrix} 1 & -2t^2 \\ 0 & -2t \end{pmatrix}x(t) = \begin{pmatrix} tg_1(t) \\ g_2(t) \end{pmatrix} \\ &= \quad \begin{pmatrix} -t\,\frac{\sin t}{2} \\ \frac{2}{3t}\Big(\cos t - 1\Big) \end{pmatrix}.\end{aligned}$$

Boundary conditions (ewa) for Gauss collocation[11]**:**

$$x_1(1)+x_2(1)=2-\cos 1, \quad x_1(1)=-\frac{\sin 1}{2}-\frac{2}{3}\Big(\cos 1-1\Big).$$

This problem must be solved as an initial value problem from right to left.
See Tables 77 to 81 for the numerical results computed with `sbvp2.0` and Tables 82 to 86 for the respective results obtained from `bvpsuite`.
Boundary conditions (roswitha) for Gauss and Radau collocation:

$$x_1(1)+x_2(1)=2-\cos 1, \quad x_1(0)=0.$$

Problem 1.31 could not be treated successfully by Radau collocation unless the preconditioner was 'switched off'. We do not report on Radau collocation here.
Gauss collocation: See Tables 87 to 91 for the numerical results obtained from `sbvp2.0`.
One can see that the second boundary condition (roswitha) is equivalent to the consistency condition formulated at $t=0$,

$$\beta(t)x_1(t)-t\gamma(t)x_2(t)=tg_1(t)-tg_2(t) \Leftrightarrow x_1(0)=\frac{2}{3}\Big(\cos 0-1\Big)=0.$$

Hence, the consistency condition has to be prescribed at $t=1$.
For Problem 1.31 condition (1.5) is not satisfied. To see this, since $A(t)$ is not constant, we calculate G_1^{-1} and all other necessary quantities directly. From

$$A=\begin{pmatrix} t \\ 1 \end{pmatrix}, \quad D(t)=(\,1 \quad t^2\,), \quad B(t)=\begin{pmatrix} 1 & -2t^2 \\ 0 & -2t \end{pmatrix}, \quad g(t)=\begin{pmatrix} -\frac{t\sin t}{2} \\ \frac{2}{3t}(\cos t-1) \end{pmatrix},$$

we have

$$Q_0(t)=\begin{pmatrix} 0 & -t^2 \\ 0 & 1 \end{pmatrix}, \quad D^-=\begin{pmatrix} 1 \\ 0 \end{pmatrix}, \quad G_0(t)=\begin{pmatrix} t & t^3 \\ 1 & t^2 \end{pmatrix},$$

and

$$G_1(t)=G_0(t)+B(t)Q_0(t)=\begin{pmatrix} t & t^3 \\ 1 & t^2 \end{pmatrix}+\begin{pmatrix} 1 & -2t^2 \\ 0 & -2t \end{pmatrix}\begin{pmatrix} 0 & -t^2 \\ 0 & 1 \end{pmatrix}=\begin{pmatrix} t & t^3-3t^2 \\ 1 & t^2-2t \end{pmatrix}.$$

Clearly,

$$G_1^{-1}(t)=\frac{1}{t^2}\begin{pmatrix} t^2-2t & -t^3+3t^2 \\ -1 & t \end{pmatrix}, \quad tG_1^{-1}(t)=\frac{1}{t}\begin{pmatrix} t^2-2t & -t^3+3t^2 \\ -1 & t \end{pmatrix}=O\left(\frac{1}{t}\right).$$

However,

$$G_1^{-1}(t)g(t)=\frac{1}{t^2}\begin{pmatrix} t^2-2t & -t^3+3t^2 \\ -1 & t \end{pmatrix}\begin{pmatrix} -\frac{t\sin t}{2} \\ \frac{2}{3t}(\cos t-1) \end{pmatrix}=\frac{1}{t^2}\begin{pmatrix} O(t^2) \\ O(t^2) \end{pmatrix}\in C[0,1].$$

Here, the canonical projector (2.7) is

$$Q_{can}(t)=\begin{pmatrix} 1 & 0 \\ \frac{-1}{t^2} & 0 \end{pmatrix}=O\left(\frac{1}{t^2}\right).$$

Class 1.4, $k=0$

Problem 1.41
We choose α,β and γ as follows:

$$\alpha(t)=t, \;\; \alpha'(t)=1, \;\; \beta(t)=1, \;\; \gamma(t)=-2t.$$

[11]Here,

$$\lim_{t\to 0}\left(\frac{2}{t}\right)=\lim_{t\to 0}\left(\frac{\lambda}{t}\right), \;\; \lambda>0$$

and therefore we need to prescribe the value of $u(1)=x_1(1)+x_2(1)$. Also, note that the above boundary conditions are consistent with the algebraic equation for $x_2(t)$,

$$(x_1(t)+t^2x_2(t))'-2tx_2(t)=\frac{2}{3t}\Big(\cos t-1\Big)$$

at $t=1$, $2+\sin 1-2\,x_2(1)=\frac{2}{3}\Big(\cos 1-1\Big) \Leftrightarrow x_2(1)=-\frac{1}{3}\Big(\cos 1-1\Big)+1+\frac{\sin 1}{2}$.

This means that (2.2) reads:

$$\begin{aligned} u'(t) \quad &:= \quad \frac{a(t)}{t}\,u(t) - \frac{1}{t}\Big((-2t-1)g_1(t) + (t+1)g_2(t)\Big) \\ &= \quad -\frac{2t+1}{t}\,u(t) + \frac{1}{t}\Big((2t+1)g_1(t) - (t+1)g_2(t)\Big), \end{aligned} \tag{2.9}$$

where $a(t) = -(2t+1)$ and $a(0) = -1$. Since $a(0)$ is negative, we have to enforce $u(0) = 0$, or equivalently, $u(0) = x_1(0) + \alpha(0)x_2(0) = x_1(0) = 0$. For $a(0)$ positive, we need to prescribe the value $u(1)$. For $a(0) = 0$, we may prescribe either the value $u(0)$ or the value $u(1)$.
For u and g_1 given below, we calculate g_2 from (2.2) and obtain

$$u(t) = \sin t, \quad g_1(t) = -\sin t, \quad g_2(t) = -\frac{t\cos t + 2(2t+1)\sin t}{t+1},$$

and $g_1(1) = -\sin 1$, $g_2(1) = -\frac{\cos 1 + 6\sin 1}{2}$. We now calculate x and have
Solution:

$$x_1(t) = 2\sin t + (g_2(t) - g_1(t)) \in C^\infty[0,1]$$

and

$$x_2(t) = -\frac{\sin t}{t} - \frac{1}{t}\Big(g_2(t) - g_1(t)\Big) \in C^\infty[0,1].$$

System of DAEs:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + t\,x_2(t))' \quad + \quad \begin{pmatrix} 1 & -1 \\ 0 & -2t-1 \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} -\sin t \\ -\frac{t\cos t + 2(2t+1)\sin t}{t+1} \end{pmatrix}.$$

Boundary conditions (ewa)[12] for Gauss collocation:

$$x_1(0) = 0, \quad x_1(1) + 2x_2(1) = \frac{1}{2}\Big(\cos 1 + 4\sin 1\Big).$$

For the Problem 1.41 the condition (1.5) is satisfied. From

$$\alpha(t) = t, \quad \alpha'(t) = 1, \quad \gamma(t) = -2t, \quad \beta(t) = 1, \quad \alpha(t)\beta(t) + \gamma(t) = -t,$$

and (2.5), we derive

$$G_1^{-1}(t) = -\frac{1}{t}\begin{pmatrix} -t-1 & 1 \\ -1 & 1 \end{pmatrix}.$$

Hence,

$$G_1^{-1}(t) = O\left(\frac{1}{t}\right) \quad \Rightarrow \quad tG_1^{-1}(t) = O\left(1\right).$$

Moreover,

$$G_1^{-1}(t)g(t) = -\frac{1}{t}\begin{pmatrix} -t-1 & 1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} -\sin t \\ -\frac{t\cos t + 2(2t+1)\sin t}{t+1} \end{pmatrix} = \begin{pmatrix} -t-1 & 1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} O(1) \\ O(1) \end{pmatrix} \in C[0,1].$$

The canonical projector (2.7) can be written as

$$Q_{can}(t) = \begin{pmatrix} -1 & -2t \\ \frac{1}{t} & 2 \end{pmatrix} = O\left(\frac{1}{t}\right).$$

See Tables 92 to 96 and Tables 97 to 101 for the test runs carried out with `sbvp2.0` and `bvpsuite`, respectively.
The treatment by Radau collocation is not possible for Problems 1.41 and 1.42: The continuity condition $x_1(0) = 0$ has to be posed at $t = 0$. This condition is identical with the consistency condition (2.4) formulated for $t = 0$ which

[12] Also, note that the second condition is consistent with the algebraic equation for $x_2(t)$,

$$(x_1(t) + t^2x_2(t))' - (2t+1)x_2(t) = -\frac{t\cos t + 2(2t+1)\sin t}{t+1}$$

at $t = 1$, $\cos 1 - 3x_2(1) = -(\cos 1 + 6\sin 1)/2 \Leftrightarrow x_2(1) = \frac{1}{2}\cos 1 + \sin 1$.

thus has to be posed at $t = 1$. On the other hand, if we prescribe (2.4) at $t = 1$ it coincides with the collocation equation for the Radau point $t = 1$.

Problem 1.42
The functions α, β and γ are as in Example 1.41. Different u and g_1 establish another g_2:

$$u(t) = e^t - 1, \;\; g_1(t) = e^t \;\Rightarrow\; g_2(t) = -\frac{te^t - 2t - 1}{t+1},$$

and $g_1(1) = e^1$, $g_2(1) = \frac{3-e^1}{2}$. Finally we have:
Solution:

$$x_1(t) = 2(e^t - 1) + (g_2(t) - g_1(t)) \in C^\infty[0,1]$$

and

$$x_2(t) = -\frac{e^t - 1}{t} - \frac{1}{t}\Big(g_2(t) - g_1(t)\Big) \in C^\infty[0,1].$$

System of DAEs:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + t\, x_2(t))' \;\; + \;\; \begin{pmatrix} 1 & -1 \\ 0 & -2t-1 \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} e^t \\ -\frac{te^t - 2t - 1}{t+1} \end{pmatrix}.$$

Boundary conditions (ewa)[13] **for Gauss collocation:**

$$x_1(0) = 0, \;\; x_1(1) + 2x_2(1) = \frac{3(e^1 - 1)}{2}.$$

For Problem 1.42, the condition (1.5) is satisfied. This problem differs from Problem 1.41 only by the right-hand side g. Therefore, we only need to consider $G_1^{-1}(t)g(t)$,

$$G_1^{-1}(t)g(t) = -\frac{1}{t}\begin{pmatrix} -t-1 & 1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} e^t \\ -\frac{te^t - 2t - 1}{t+1} \end{pmatrix} = -\frac{1}{t}\begin{pmatrix} O(t) \\ O(t) \end{pmatrix} \in C[0,1].$$

Finally, the canonical projector (2.7) has the same form as in Example 1.41, namely

$$Q_{can}(t) = \begin{pmatrix} -1 & -2t \\ \frac{1}{t} & 2 \end{pmatrix} = O\left(\frac{1}{t}\right).$$

Tables 102 to 106 give the numerical results obtained by `sbvp2.0`, whereas Tables 107 to 111 display the numerical outcome of `bvpsuite`.

2.3.2 Convergence results

In Tables 57 to 111, we solved the Problems 1.11, 1.21, 1.22, 1.31, 1.41, and 1.42 with boundary conditions *ewa*, and additionally, Problem 1.31 with boundary conditions *roswitha*. The convergence results for Problems 1.11, 1.22, 1.41(`bvpsuite`), 1.42(`bvpsuite`) are analogous to those described for regular problems. For all these problems the canonical projectors are unbounded for $t \to 0$, $Q_{can}(t) = O(1/t)$. However, at the same time the involved inherent ODEs are IVPs and therefore an additional factor t helps to balance the unboundedness of $Q_{can}(t) = O(1/t)$, see the section on error analysis for IVPs in [24].

For Problems 1.21 and 1.31 we observe order reductions in the full solution vector x. Nevertheless, for appropriately smooth differential component u we observe at least the stage order convergence, as in the regular case. For equidistant collocation points we have

$$geu_{\text{tau}} = O(h^m),\; geu_{\text{tcol}} = O(h^m),$$

[13] Note that the second condition is consistent with the algebraic equation for $x_2(t)$,

$$(x_1(t) + t^2 x_2(t))' - (2t+1)x_2(t) = -\frac{te^t - 2t - 1}{t+1}$$

at $t = 1$, $e^1 - 3x_2(1) = -(e^1 - 3)/2 \Leftrightarrow x_2(1) = \frac{e^1-1}{2}$.

for m even and

$$geu_{\text{tau}} = O(h^{m+1}),\ geu_{\text{tcol}} = O(h^{m+1}),$$

for m odd. For the full solution vector x we observe order reductions occurring in the algebraic component. In Example 1.21, Tables 62 to 71, and in Example 1.31, see Tables 77 to 91 one looses one power of h, or more precisely

$$gex_{\text{tau}} = O(h^{m-1}),\ gex_{\text{tcol}} = O(h^{m-1}),$$

for m even and

$$gex_{\text{tau}} = O(h^{m}),\ gex_{\text{tcol}} = O(h^{m}),$$

for m odd. For Gaussian points superconvergence does not hold, see for example Problem 1.31, Table 79 for $m = 3$.

The order reduction in Examples 1.21 and 1.31 can be explained by the fact that the condition (1.5) is violated. Moreover, the canonical projectors satisfy $Q_{can}(t) = O(1/t^2)$. The inherent ODE is here a terminal value problem and therefore, there are no additional t powers helping to balance the behavior of $Q_{can}(t)$.

2.4 Singularity of the first kind – non-smooth solution x

This problem class is subject to further investigations. No numerical experiments are provided here.

Class 2.1: Jump discontinuity in $x_1(t)$ and $x_2(t)$

Problem 2.11
The functions α, β and γ, as well as k are as in Example 1.41, but g_1 and g_2 are different. Therefore, we have
System of DAEs:

$$\begin{aligned}\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + t\,x_2(t))' \quad &+ \quad \begin{pmatrix} 1 & -1 \\ 0 & -2t-1 \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\ &= \begin{pmatrix} 2\cos(2t) + \sin(2t) - t\,\mathrm{sgn}(t-0.5) - \mathrm{sgn}(t-0.5) \\ 2\cos(2t) - 2t\,\mathrm{sgn}(t-0.5) - \mathrm{sgn}(t-0.5) \end{pmatrix}.\end{aligned}$$

We solve the problem by treating an enlarged system whose solution is $(x_1(t), x_2(t), x_3(t))^T$, where $x_3(t) := x_1(t) + t\,x_2(t)$. This system reads:

$$\begin{aligned}\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_3(t))' \quad &+ \quad \begin{pmatrix} 1 & -1 \\ 0 & -2t-1 \end{pmatrix} \begin{pmatrix} x_1(t) \\ x_2(t) \end{pmatrix} = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\ &= \begin{pmatrix} 2\cos(2t) + \sin(2t) - t\,\mathrm{sgn}(t-0.5) - \mathrm{sgn}(t-0.5) \\ 2\cos(2t) - 2t\,\mathrm{sgn}(t-0.5) - \mathrm{sgn}(t-0.5) \end{pmatrix} \\ x_3(t) \quad &= \quad x_1(t) + t\,x_2(t),\end{aligned}$$

and the solution thereof is

$$x_1(t) = \sin(2t) - t\,\mathrm{sgn}(t-0.5),\ \ x_2(t) = \mathrm{sgn}(t-0.5),\ \ x_3(t) = \sin(2t)$$

when we pose the boundary condition

$$x_3(0) = 0.$$

Note that $x_3(t)$ is the solution of the associated inherent ODE and therefore the boundary condition needs to be specified for this component of $x(t)$.

Class 2.2: $x \in C^5$, $u \in C^{10}$

Problem 2.21
We choose $\alpha = t^5$, $\beta = 0$ and $\gamma = t$. So $\alpha' = 5t^4$. With this setting, the equation for u reads

$$u'(t) = \frac{5}{t}u(t) + \frac{1}{t^2}(-5g_1(t) + t^2 g_2(t) + 5t^4 g_2(t)).$$

Choose $u(t) = 2t^{21/2}$, so $u \in C^{10}[0,1]$. With $g_1(t) = t^{23/2} + 16t^{19/2}$ and $g_2(t) = 16t^{19/2}$, we obtain the solution:
Solution:

$$x_1(t) = t^{\frac{21}{2}},$$
$$x_2(t) = t^{\frac{11}{2}}.$$

Then, the second component x_2 of the solution is only in $C^5[0,1]$.
System of DAEs:

$$\begin{aligned}
\begin{pmatrix} 1 \\ 1 \end{pmatrix} (u(t))' \quad &+ \quad \begin{pmatrix} t & -5t^4 \\ 0 & -5t^4 \end{pmatrix} \begin{pmatrix} x_1(t) \\ x_2(t) \end{pmatrix} = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} \\
&= \quad \begin{pmatrix} t^{23/2} + 16t^{19/2} \\ 16t^{19/2} \end{pmatrix} \\
u(t) \quad &= \quad x_1(t) + t^5\, x_2(t),
\end{aligned}$$

Boundary conditions

$$x_1(1) + x_2(1) = 2, \quad x_1(1) = 1.$$

and the additional condition for the substitution $u = Dx$

$$\frac{1}{3}u(0) + \frac{2}{3}u(1) = \frac{1}{3}D(0)x(0) + \frac{2}{3}D(1)x(1) = \frac{4}{3}.$$

2.5 Singularity of the second kind

The following examples are first constructed for a set of general parameters. By choosing the values of k in a proper way it is possible to derive specific examples with a singularity of second kind (with $1/t^k$ asymptotics). After the general discussion several examples with a singularity of the second kind are specified. For this class of problems no convergence theory for collocation applied to solve the inherent ODEs is available, yet. Therefore, this section has purely experimental character.

2.5.1 Class 3.1: $\alpha(t) \equiv 0$

Problem 3.11
In this case $\varphi(t) = \gamma(t)$ and therefore the equation for u reads:

$$u'(t) = -\beta(t)u(t) + g_1(t).$$

The requirement $\varphi(t) \neq 0$ for $t \in (0,1]$ is equivalent to $\gamma(t) \neq 0$ for $t \in (0,1]$. Choose $\beta(t) = \frac{1}{t^k}$, $\gamma(t) = k$ and $u(t) = t^k$. Then

$$u'(t) = -\frac{1}{t^k}\, u(t) + g_1(t)$$

and $g_1(t) = kt^{k-1} + 1$. With $g_2(t) = 0$, we have:
Solution:

$$x_1(t) = u(t) = t^k, \;\; x_2(t) = \frac{1}{kt^k}\, t^k - \frac{1}{k}(kt^{k-1} + 1) = -t^{k-1}.$$

System of DAEs:

$$\begin{pmatrix} t^k \\ 1 \end{pmatrix} (x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & k \end{pmatrix} x(t) = \begin{pmatrix} t^k g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^k(kt^{k-1} + 1) \\ 0 \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) = 0, \quad x_1(1) - kx_2(1) = k + 1.$$

See Tables 112 to 141 for the numerical results.
Boundary conditions (roswitha) for Radau collocation:

$$x_1(0) = 0, \quad x_1(1) = 1.$$

Here, $x_1(0) = 0$ and $x_1(1) = 1$ are equivalent to $u_1(0) = 0$ and $u_2(1) = 1$, respectively. Since these conditions and (1.4) are linearly dependent the code does not work.

Problem 3.112 Let $k = 2$. Then we obtain a singularity of the second kind and $\beta(t) = \frac{1}{t^2}$, $\gamma(t) = 2$ and $u(t) = t^2$ yield

$$u'(t) = -\frac{1}{t^2}\, u(t) + g_1(t)$$

with $g_1(t) = 2t + 1$ and $g_2(t) = 0$.
Solution:

$$x_1(t) = t^2, \quad x_2(t) = -t.$$

System of DAEs:

$$\begin{pmatrix} t^2 \\ 1 \end{pmatrix} (x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} x(t) = \begin{pmatrix} t^2 g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^2(2t+1) \\ 0 \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) = 0, \quad x_1(1) + x_2(1) = e - 1.$$

See Tables 112 to 116 for the numerical results.
For higher order collocation, this solution may be too simple in the sense that collocation reproduces the exact solution for polynomial degree $m \geq 2$. In this case one only needs to take a larger value of k.
Problem 3.1125 $k = 2.5$
See Tables 117 to 121 for the numerical results.
Problem 3.113 $k = 3$
See Tables 122 to 126 for the numerical results.
Problem 3.1135 $k = 3.5$
See Tables 127 to 131 for the numerical results.
Problem 3.114 $k = 4$
See Tables 132 to 136 for the numerical results.
Problem 3.1145 $k = 4.5$
See Tables 137 to 141 for the numerical results.

2.5.2 Class 3.2: $\alpha'(t) \equiv 0$, $k = 0$

Problem 3.21
For $\gamma(t) = e^{t^\ell}$ and $\alpha(t) = -\beta(t) = 1$ it follows that $\varphi(t) = e^{t^\ell} - 1$. Then

$$u'(t) = \frac{e^{t^\ell}}{e^{t^\ell} - 1}\, u(t) + \frac{1}{e^{t^\ell} - 1}(e^{t^\ell} g_1(t) - g_2(t)). \tag{2.10}$$

To avoid the singularity in the inhomogeneity we need to choose $g_1(t)$ and $g_2(t)$ in a proper way. Therefore we first rewrite (2.10) and obtain

$$g_2(t) = -u'(t)(e^{t^\ell} - 1) + e^{t^\ell}(u(t) + g_1(t)).$$

Choose $u(t) = e^{t^\ell} - 1$ then $u'(t) = e^{t^\ell} \ell t^{\ell-1}$, and $g_1(t) = 0$. Also,

$$g_2(t) = -e^{t^\ell} \ell t^{\ell-1}(e^{t^\ell} - 1) + e^{t^\ell}(e^{t^\ell} - 1)$$

follows. Moreover, we have
Solution:

$$x_1(t) = e^{t^\ell} \ell t^{\ell-1}, \;\; x_2(t) = -1 + e^{t^\ell}(1 - \ell t^{\ell-1}).$$

System of DAEs:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + x_2(t))' + \begin{pmatrix} -1 & 0 \\ 0 & e^{t^\ell} \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} 0 \\ -e^{t^\ell} \ell t^{\ell-1}(e^{t^\ell} - 1) + e^{t^\ell}(e^{t^\ell} - 1) \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) = 0, \quad x_1(1) + x_2(1) = e - 1.$$

See Tables 142 to 171 for the numerical results.

Boundary conditions (roswitha) for Radau collocation :

$$x_1(0) + x_2(0) = 0, \quad x_1(1) + x_2(1) = e - 1.$$

The above conditions (roswitha) are equivalent to $u(0) = 0$ and $u(1) = 1$. Together with (1.4) they are linearly dependent and consequently, the solver does not work.

Problem 3.212 For $\ell = 2$ we have

$$u'(t) = \frac{e^{t^2}}{e^{t^2} - 1} u(t) + \frac{1}{e^{t^2} - 1}(e^{t^2} g_1(t) - g_2(t)).$$

With $u(t) = e^{t^2} - 1$, $u'(t) = 2te^{t^2}$, and $g_1(t) = 0$, we have $g_2(t) = e^{t^2}(-2t + 1)(e^{t^2} - 1)$.

Solution:

$$x_1(t) = 2te^{t^2}, \;\; x_2(t) = -1 + e^{t^2}(1 - 2t).$$

System of DAEs:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} (x_1(t) + x_2(t))' + \begin{pmatrix} -1 & 0 \\ 0 & e^{t^2} \end{pmatrix} x(t) = \begin{pmatrix} g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} 0 \\ e^{t^2}(-2t + 1)(e^{t^2} - 1) \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss collocation:

$$x_1(0) = 0, \quad x_1(1) + x_2(1) = e - 1.$$

See Tables 142 to 146 for the numerical results.

Problem 3.2125 $l = 2.5$

See Tables 147 to 151 for the numerical results.

Problem 3.213 $l = 3$

See Tables 152 to 156 for the numerical results.

Problem 3.2135 $l = 3.5$

See Tables 157 to 161 for the numerical results.

Problem 3.214 $l = 4$

See Tables 162 to 166 for the numerical results.

Problem 3.2145 $l = 4.5$

See Tables 167 to 171 for the numerical results.

2.5.3 Convergence results

Here, we solved the Problems 3.112, 3.1125, 3.113, 3.1135, 3.114, 3.1145, and 3.212, 3.2125, 3.213, 3.2135, 3.214, 3.2145, see Tables 112 to 171. Unfortunately, the series 3.11xx does not provide a basis for a report on a clear convergence behavior. The values of ℓ are either too small, e.g. $\ell = 2, 3, 4$, and therefore very soon collocation reproduces the exact solution values, or the solution is not sufficiently smooth, e.g. $\ell = 3.5, 4.5$, and so the convergence order is reduced due to the non-smooth higher derivatives. For $\ell = 4$, Tables 132 to 136 show a clear order reduction in the algebraic component. The differential component shows the following behavior:

$$geu_{\text{tau}} = O(h^m), \; geu_{\text{tcol}} = O(h^m),$$

for m even and

$$geu_{\text{tau}} = O(h^{m+1}), \; geu_{\text{tcol}} = O(h^{m+1}),$$

for m odd. More meaningful results have been obtained for the series 3.21xx. Even for smooth solution x, we again observe order reductions in x which is always computed less accurately than u. Typically, this order reduction occurs for $m = 2$. For other values of m, the stage order can be observed in both components of x.

2.5.4 Class 3.3: $\alpha(t) \equiv 0$

We will not provide any numerical results for this class of problems here. Again, a general construction principle is presented first, and then particular examples are given.

Problem 3.31
Functions $\alpha(t),\ \beta(t),\ \gamma(t)$ are chosen as in Problem 3.11. With $u(t) = t^k t^n \sqrt{t} = t^{k+n+\frac{1}{2}}$ and $u'(t) = (k+n+\frac{1}{2})t^{k+n-\frac{1}{2}}$ it follows that $g_1(t) = (k+n+\frac{1}{2})t^{k+n-\frac{1}{2}} + t^{n+\frac{1}{2}}$. For $g_2(t) = t^{n+\frac{1}{2}}$ we obtain
Solution:

$$x_1(t) = u(t) = t^k t^n \sqrt{t} = t^{k+n+\frac{1}{2}} \in C^{k+n}[0,1],$$
$$x_2(t) = \frac{1}{k}\left(t^{n+\frac{1}{2}} - \left(k+n+\frac{1}{2}\right)t^{n+k-\frac{1}{2}}\right) \in C^n[0,1].$$

System of DAEs:

$$\begin{pmatrix} t^k \\ 1 \end{pmatrix}(x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & k \end{pmatrix} x(t) = \begin{pmatrix} t^k g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^k((n+k+\frac{1}{2})t^{n+k-\frac{1}{2}} + t^{n+\frac{1}{2}}) \\ t^{n+\frac{1}{2}} \end{pmatrix}.$$

Boundary conditions:

$$x_1(0) = 0, \quad x_1(1) - kx_2(1) = n+k+\frac{1}{2}.$$

Problem 3.32
Let $k=2$, $n=5$, and $\alpha(t),\ \beta(t),\ \gamma(t)$ as in Problem 3.11. For $u(t) = t^{7.5}$ and thus $u'(t) = 7.5t^{6.5}$, it follows that $g_1(t) = 7.5t^{6.5} + t^{5.5}$. With $g_2(t) = t^{5.5}$ we have,
Solution:

$$x_1(t) = u(t) = t^{7.5} \in C^7[0,1],$$
$$x_2(t) = \frac{1}{2}\left(t^{5.5} - 7.5t^{6.5}\right) \in C^5[0,1].$$

System of DAEs:

$$\begin{pmatrix} t^2 \\ 1 \end{pmatrix}(x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} x(t) = \begin{pmatrix} t^2 g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^2(7.5t^{6.5} + t^{5.5}) \\ t^{5.5} \end{pmatrix}.$$

Boundary conditions:

$$x_1(0) = 0, \quad x_1(1) - 2x_2(1) = 7.5.$$

The following examples were too difficult for a numerical treatment:

Problem 3.33
Again $\alpha(t),\ \beta(t)$, and $\gamma(t)$ are as in Problem 3.11. For $u(t) = t^k t^n \sin\frac{1}{t} = t^{k+n}\sin\frac{1}{t}$, holds $u'(t) = (k+n)t^{n+k-1}\sin\frac{1}{t} - t^{k+n-2}\cos\frac{1}{t}$. With $g_1(t) = u'(t) + t^n \sin\frac{1}{t}$ and $g_2(t) = g_1(t)$ we have,
Solution:

$$x_1(t) = u(t) = t^{k+n}\sin\frac{1}{t} \in C^p[0,1], \quad p = \lfloor\frac{k+n-1}{2}\rfloor,$$
$$x_2(t) = \frac{1}{k}t^n \sin\frac{1}{t} \in C^p[0,1], \quad p = \lfloor\frac{n-1}{2}\rfloor.$$

System of DAEs:

$$\begin{pmatrix} t^k \\ 1 \end{pmatrix}(x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & k \end{pmatrix} x(t) = \begin{pmatrix} t^k g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^k((k+n)t^{n+k-1}\sin\frac{1}{t} - t^{k+n}\cos\frac{1}{t} + t^n\sin\frac{1}{t}) \\ (k+n)t^{n+k-1}\sin\frac{1}{t} - t^{k+n}\cos\frac{1}{t} + t^n\sin\frac{1}{t} \end{pmatrix}.$$

Boundary conditions:

$$x_1(0) = 0, \quad x_1(1) - kx_2(1) = 0.$$

Problem 3.34
For $k=2$ and $n=5$ we have $u(t) = t^7\sin\frac{1}{t}$ and therefore $u'(t) = 7t^6\sin\frac{1}{t} - t^5\cos\frac{1}{t}$. We choose $g_1(t) = u'(t) + t^5\sin\frac{1}{t}$ and $g_2(t) = g_1(t)$ which yields,
Solution:

$$x_1(t) = u(t) = t^7\sin\frac{1}{t} \in C^3[0,1],$$

$$x_2(t) = \frac{1}{2}t^5 \sin\frac{1}{t} \in C^2[0,1].$$

System of DAEs:

$$\begin{pmatrix} t^2 \\ 1 \end{pmatrix}(x_1(t))' + \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} x(t) = \begin{pmatrix} t^2 g_1(t) \\ g_2(t) \end{pmatrix} = \begin{pmatrix} t^2(7t^6 \sin\frac{1}{t} - t^5 \cos\frac{1}{t} + t^5 \sin\frac{1}{t}) \\ 7t^6 \sin\frac{1}{t} - t^5 \cos\frac{1}{t} + t^5 \sin\frac{1}{t} \end{pmatrix}.$$

Boundary conditions:

$$x_1(0) = 0, \quad x_1(1) - kx_2(1) = 0.$$

2.6 Problem Class 2

2.6.1 Problems with bounded canonical projector, B_{22} nonsingular

In this section we consider the following semi-explicit problem posed on the interval $0 < t \le 1$:

$$tx_1'(t) + B_{11}x_1(t) + B_{12}x_2(t) = g_1(t), \tag{2.11a}$$
$$B_{21}x_1(t) + B_{22}x_2(t) = g_2(t), \tag{2.11b}$$

where $B_{11}, B_{12}, B_{21}, B_{22} \in \mathbb{R}^{2\times 2}$, $g_1(t), g_2(t) \in C[0,1]$ and the matrix B_{22} is nonsingular. Due to the problem structure we can immediately rewrite (2.11) to decouple the inherent ODE system and the system of algebraic constraints.

We first express $x_2(t)$ from (2.11b),

$$x_2(t) = B_{22}^{-1}(g_2(t) - B_{21}x_1(t)),$$

and rewrite (2.11a),

$$tx_1'(t) = -\big(B_{11}x_1(t) + B_{12}B_{22}^{-1}(g_2(t) - B_{21}x_1(t))\big) + g_1(t) \Rightarrow$$
$$x_1'(t) = -\frac{1}{t}\left(B_{11}x_1(t) - B_{12}B_{22}^{-1}B_{21}x_1(t)\right) + \frac{1}{t}\left(g_1(t) - B_{12}B_{22}^{-1}g_2(t)\right).$$

Consequently, the inherent ODE system is singular with a singularity of the first kind and has the form

$$x_1'(t) = \frac{1}{t}Mx_1(t) + f(t), \quad 0 < t \le 1, \tag{2.12}$$

where

$$M = B_{12}B_{22}^{-1}B_{21} - B_{11}, \quad f(t) = \frac{1}{t}\left(g_1(t) - B_{12}B_{22}^{-1}g_2(t)\right).$$

Problems 4.1 – 4.4. given below are specified in such a way that M has a special eigen-structure,
Problem 4.1: Eigenvalues $\lambda_1 = 0$, $\lambda_2 = -2$,
Problem 4.2: Eigenvalues $\lambda_1 = 0$, $\lambda_2 = 5$,
Problem 4.3: Eigenvalues $\lambda_1 = \lambda_2 = 0$,
Problem 4.4: Eigenvalues $\lambda_1 = 5$, $\lambda_2 = -3$.

The initial conditions which guarantee that for $f \in C[0,1]$ the solution $x_1(t)$ of (2.12) is at least in $C[0,1]$ read $Qx_1(0) = 0$, where Q is a projection onto the subspace of $\mathbb{R}^2$ spanned either by the eigenvector associated with the negative eigenvalue of M (Example 4.1 and 4.4) or by the principal vector associated with the eigenvalue zero (Example 4.3). For uniqueness we need to prescribe the value of Px_1, where $P = I - Q$. Clearly, $P = S + R$, where S is a projection onto the subspace of $\mathbb{R}^2$ spanned by the eigenvector associated with the positive eigenvalue of M (Example 4.2 and 4.4) and R is a projection onto the subspace of $\mathbb{R}^2$ spanned by the eigenvector associated with the eigenvalue zero (Example 4.1, 4.2 and 4.3). According to theory, one needs to prescribe Sx_1 at $t = 1$, but Rx_1 can be fixed at either $t = 0$ or $t = 1$.
We now give the specification of four examples having the above form.

Problem 4.1
The matrices B_{ij} are

$$B_{11} = \begin{pmatrix} -11 & -18 \\ 12 & 19 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{5} \end{pmatrix},$$

and the right-hand side is given by

$$g_1(t) = \begin{pmatrix} te^{mt}(m\sin(t)+\cos(t)) - 12e^{mt}\sin(t) - 15\cos(mt) + 13.5 \\ -mt\sin(mt) + 13e^{mt}\sin(t) + 17\cos(mt) - 16 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^{mt}\sin(t) + 2\cos(mt) - 2.5 \\ 2.2e^{mt}\sin(t) + 3\cos(mt) - 3 \end{pmatrix}.$$

For the system (2.12) we have $\lambda_1 = 0$, $\lambda_2 = -2$ and

$$M = \begin{pmatrix} 4 & 6 \\ -4 & -6 \end{pmatrix},\ ev_0 = \begin{pmatrix} -1.5 \\ 1 \end{pmatrix},\ ev_{-2} = \begin{pmatrix} -1 \\ 1 \end{pmatrix},\ R = \begin{pmatrix} 3 & 3 \\ -2 & -2 \end{pmatrix},\ Q = \begin{pmatrix} -2 & -3 \\ 2 & 3 \end{pmatrix}.$$

Moreover,

$$f(t) = \frac{1}{t}\begin{pmatrix} te^{mt}(m\sin(t)+\cos(t)) - 4e^{mt}\sin(t) - 6\cos(mt) + 6 \\ -tm\sin(mt) + 4e^{mt}\sin(t) + 6\cos(mt) - 6 \end{pmatrix},$$

and

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{mt}\sin(t) - 1.5 \\ \cos(mt) \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(mt) - 1 \\ e^{mt}\sin(t) \end{pmatrix}.$$

Therefore, $Qx_1(0) = 0$ is equivalent to

$$2x_{11}(0) + 3x_{12}(0) = 0.$$

For the second condition we have the choice between $Rx_1(1)$ and $Rx_1(0)$, which means

$$x_{11}(1) + x_{12}(1) = e^m\sin(1) + \cos(m) - 1.5$$

or

$$x_{11}(0) + x_{12}(0) = -0.5.$$

For x_2 we can prescribe the following consistency condition

$$B_{22}x_2(t) + B_{21}x_1(t) = g_2(t)$$

to hold either at $t = 0$ or $t = 1$.

Problem 4.11 Let $m = 1$. Then the system (2.12) has the form

$$x_1'(t) = \frac{1}{t}\begin{pmatrix} 4 & 6 \\ -4 & -6 \end{pmatrix} x_1(t) + \frac{1}{t}\begin{pmatrix} te^t(\sin(t)+\cos(t)) - 4e^t\sin(t) - 6\cos(t) + 6 \\ -t\sin(t) + 4e^t\sin(t) + 6\cos(t) - 6 \end{pmatrix}.$$

Solution:

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^t\sin(t) - 1.5 \\ \cos(t) \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(t) - 1 \\ e^t\sin(t) \end{pmatrix}.$$

System of DAEs:

$$\begin{aligned} tx_1'(t) + B_{11}x_1(t) + B_{12}x_2(t) &= g_1(t), \\ B_{21}x_1(t) + B_{22}x_2(t) &= g_2(t), \end{aligned}$$

with

$$B_{11} = \begin{pmatrix} -11 & -18 \\ 12 & 19 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{5} \end{pmatrix}$$

and

$$g_1(t) = \begin{pmatrix} te^t(\sin(t)+\cos(t)) - 12e^t\sin(t) - 15\cos(t) + 13.5 \\ -t\sin(t) + 13e^t\sin(t) + 17\cos(t) - 16 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^t\sin(t) + 2\cos(t) - 2.5 \\ 2.2e^t\sin(t) + 3\cos(t) - 3 \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss and Radau collocation:

$$Qx_1(0) = 0 \ \Leftrightarrow\ 2x_{11}(0) + 3x_{12}(0) = 0,$$

$$Rx_1(1) = x_{11}(1) + x_{12}(1) = e\sin(1) + \cos(1) - 1.5,$$

and the consistency condition at $t = 0$,

$$\begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{5} \end{pmatrix} x_2(0) + \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix} x_1(0) = \begin{pmatrix} -0.5 \\ 0 \end{pmatrix}.$$

See Tables 172 to 176 for the numerical results.

Problem 4.2
The matrices B_{ij} are

$$B_{11} = \begin{pmatrix} 9 & 12 \\ -8 & -11 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{2} \end{pmatrix},$$

and the right-hand side is given by

$$g_1(t) = \begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) + 8e^{mt}\sin(t) + 15\cos(mt) + 2t^5 - 16.5 \\ -mt\sin(mt) - 7e^{mt}\sin(t) - 13\cos(mt) - 2t^5 + 14 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^{mt}\sin(t) + 2\cos(mt) - 2.5 \\ 2.5e^{mt}\sin(t) + 3\cos(mt) - 3 - t^5 \end{pmatrix}.$$

For the system (2.12) we have $\lambda_1 = 0$, $\lambda_2 = 5$ and

$$M = \begin{pmatrix} -10 & -15 \\ 10 & 15 \end{pmatrix}, \, ev_0 = \begin{pmatrix} -1.5 \\ 1 \end{pmatrix}, \, ev_5 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}, \, R = \begin{pmatrix} 3 & 3 \\ -2 & -2 \end{pmatrix}, \, S = \begin{pmatrix} -2 & -3 \\ 2 & 3 \end{pmatrix}.$$

Moreover,

$$f(t) = \frac{1}{t}\begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) + 10e^{mt}\sin(t) + 15\cos(mt) - 15 \\ -mt\sin(mt) + 10e^{mt}\sin(t) - 15\cos(mt) + 15 \end{pmatrix},$$

and

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{mt}\sin(t) - 1.5 + t^5 \\ \cos(mt) - t^5 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(mt) - 1 \\ e^{mt}\sin(t) \end{pmatrix}.$$

This time holds $Q = 0$, and the solution is continuous. We just need to specify boundary conditions which are necessary for uniqueness. We prescribe

$$Sx_1(1) = 2x_{11}(1) + 3x_{12}(1) = 2e^m\sin(1) + 3\cos(m) - 4,$$

and for the second condition we can choose between $Rx_1(1)$ and $Rx_1(0)$, which means

$$x_{11}(1) + x_{12}(1) = e^m\sin(1) + \cos(m) - 1.5$$

or

$$x_{11}(0) + x_{12}(0) = -0.5.$$

For x_2 we can prescribe the following consistency condition

$$B_{22}x_2(t) + B_{21}x_1(t) = g_2(t)$$

to hold either at $t = 0$ or $t = 1$.

Problem 4.25 Let $m = 5$. Then the system (2.12) has the form

$$x_1'(t) = \frac{1}{t}\begin{pmatrix} -10 & -15 \\ 10 & 15 \end{pmatrix} x_1(t) + \frac{1}{t}\begin{pmatrix} te^{5t}(5\sin(t) + \cos(t)) + 10e^{5t}\sin(t) + 15\cos(5t) - 15 \\ -5t\sin(5t) + 10e^{5t}\sin(t) - 15\cos(5t) + 15 \end{pmatrix}.$$

Solution:

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{5t}\sin(t) - 1.5 + t^5 \\ \cos(5t) - t^5 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(5t) - 1 \\ e^{5t}\sin(t) \end{pmatrix}.$$

System of DAEs:

$$
\begin{aligned}
tx_1'(t) + B_{11}x_1(t) + B_{12}x_2(t) &= g_1(t), \\
B_{21}x_1(t) + B_{22}x_2(t) &= g_2(t),
\end{aligned}
$$

with

$$
B_{11} = \begin{pmatrix} 9 & 12 \\ -8 & -11 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{2} \end{pmatrix},
$$

and right-hand side

$$
g_1(t) = \begin{pmatrix} te^{5t}(5\sin(t) + \cos(t)) + 8e^{5t}\sin(t) + 15\cos(5t) + 2t^5 - 16.5 \\ -5t\sin(5t) - 7e^{5t}\sin(t) - 13\cos(5t) - 2t^5 + 14 \end{pmatrix},
$$

$$
g_2(t) = \begin{pmatrix} e^{5t}\sin(t) + 2\cos(5t) - 2.5 \\ 2.5e^{5t}\sin(t) + 3\cos(5t) - 3 - t^5 \end{pmatrix}.
$$

Boundary conditions (ewa) for Gauss and Radau collocation:
We prescribe

$$
Sx_1(1) = 2x_{11}(1) + 3x_{12}(1) = 2e^5\sin(1) + 3\cos(5) - 4,
$$

and as the second condition

$$
x_{11}(0) + x_{12}(0) = -0.5.
$$

For x_2 we can prescribe the consistency condition $B_{22}x_2(t) + B_{21}x_1(t) = g_2(t)$ at $t = 0$,

$$
\begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{2} \end{pmatrix} x_2(0) + \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix} x_1(0) = \begin{pmatrix} -0.5 \\ 0 \end{pmatrix}.
$$

See Tables 177 to 181 for the numerical results.

Problem 4.3
The matrices B_{ij} are

$$
B_{11} = \begin{pmatrix} -9 & -15 \\ 8 & 13 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{3} \end{pmatrix},
$$

and the right-hand side is given by

$$
g_1(t) = \begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) - 10e^{mt}\sin(t) - 12\cos(mt) + 9 \\ -mt\sin(mt) + 9e^{mt}\sin(t) + 11\cos(mt) - 9 \end{pmatrix},
$$

$$
g_2(t) = \begin{pmatrix} e^{mt}\sin(t) + 2\cos(mt) - 3 \\ \frac{7}{3}e^{mt}\sin(t) + 3\cos(mt) - 3 \end{pmatrix}.
$$

For the system (2.12) we have $\lambda_1 = \lambda_2 = 0$ and

$$
M = \begin{pmatrix} 6 & 9 \\ -4 & -6 \end{pmatrix}, \; ev_0 = \begin{pmatrix} -3 \\ 2 \end{pmatrix}, \; pv_0 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \; R = \begin{pmatrix} 3 & 3 \\ -2 & -2 \end{pmatrix}, \; Q = \begin{pmatrix} -2 & -3 \\ -2 & -3 \end{pmatrix}.
$$

Moreover,

$$
f(t) = \frac{1}{t}\begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) - 6e^{mt}\sin(t) - 9\cos(mt) + 9 \\ -mt\sin(mt) + 4e^{mt}\sin(t) + 6\cos(mt) - 6 \end{pmatrix},
$$

and

$$
x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{mt}\sin(t) - 3 \\ \cos(mt) + 1 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(mt) - 1 \\ e^{mt}\sin(t) \end{pmatrix}.
$$

Again, we require

$$
Qx_1(0) = 0 \;\Leftrightarrow\; 2x_{11}(0) + 3x_{12}(0) = 0.
$$

For the second condition we can choose between $Rx_1(1)$ and $Rx_1(0)$, which means

$$
x_{11}(1) + x_{12}(1) = e^m\sin(1) + \cos(m) - 2
$$

or

$$x_{11}(0) + x_{12}(0) = -1.$$

For x_2 we can prescribe the following consistency condition

$$B_{22}x_2(t) + B_{21}x_1(t) = g_2(t)$$

to hold either at $t = 0$ or $t = 1$.

Problem 4.34 Let $m = 4$. Then the system (2.12) has the form

$$x_1'(t) = \begin{pmatrix} 6 & 9 \\ -4 & -6 \end{pmatrix} x_1(t) + \frac{1}{t} \begin{pmatrix} te^{4t}(4\sin(t) + \cos(t)) - 6e^{4t}\sin(t) - 9\cos(4t) + 9 \\ -4t\sin(4t) + 4e^{4t}\sin(t) + 6\cos(4t) - 6 \end{pmatrix}.$$

Solution:

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{4t}\sin(t) - 3 \\ \cos(4t) + 1 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(4t) - 1 \\ e^{4t}\sin(t) \end{pmatrix}.$$

System of DAEs:

$$\begin{aligned} tx_1'(t) + B_{11}x_1(t) + B_{12}x_2(t) &= g_1(t), \\ B_{21}x_1(t) + B_{22}x_2(t) &= g_2(t), \end{aligned}$$

with

$$B_{11} = \begin{pmatrix} -9 & -15 \\ 8 & 13 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{3} \end{pmatrix},$$

and right-hand side

$$g_1(t) = \begin{pmatrix} te^{4t}(4\sin(t) + \cos(t)) - 10e^{4t}\sin(t) - 12\cos(4t) + 9 \\ -4t\sin(4t) + 9e^{4t}\sin(t) + 11\cos(4t) - 9 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^{4t}\sin(t) + 2\cos(4t) - 3 \\ \frac{7}{3}e^{4t}\sin(t) + 3\cos(4t) - 3 \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss and Radau collocation:
We require

$$Qx_1(0) = 0 \;\Leftrightarrow\; 2x_{11}(0) + 3x_{12}(0) = 0.$$

Furthermore, we set

$$Rx_1(1) = x_{11}(1) + x_{12}(1) = e^4\sin(1) + \cos(4) - 2.$$

The consistency conditions for x_2 read $B_{22}x_2(0) + B_{21}x_1(0) = g_2(0)$, or equivalently,

$$\begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{3} \end{pmatrix} x_2(0) + \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix} x_1(0) = \begin{pmatrix} -3 \\ -6 \end{pmatrix}.$$

See Tables 182 to 186 for the numerical results.

Problem 4.4
The matrices B_{ij} are

$$B_{11} = \begin{pmatrix} -8 & -15 \\ 10 & 17 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} \frac{1}{7} & 0 \\ 0 & \frac{1}{4} \end{pmatrix},$$

and the right-hand side is given by

$$g_1(t) = \begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) - 9e^{mt}\sin(t) - 12\cos(mt) - 10.5t^5 + 12 \\ -mt\sin(mt) + 11e^{mt}\sin(t) + 15\cos(mt) + 7t^5 - 15 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^{mt}\sin(t) + \frac{8}{7}\cos(mt) - 0.5t^5 - \frac{8}{7} \\ \frac{9}{4}e^{mt}\sin(t) + 3\cos(mt) - 3 \end{pmatrix}.$$

For the system (2.12) we have, $\lambda_1 = 5$, $\lambda_2 = -3$ and

$$M = \begin{pmatrix} 21 & 24 \\ -16 & -19 \end{pmatrix},\ ev_5 = \begin{pmatrix} -1.5 \\ 1 \end{pmatrix},\ ev_{-3} = \begin{pmatrix} -1 \\ 1 \end{pmatrix},\ S = \begin{pmatrix} 3 & 3 \\ -2 & -2 \end{pmatrix},\ Q = \begin{pmatrix} -2 & -3 \\ 2 & 3 \end{pmatrix}.$$

Moreover,

$$f(t) = \frac{1}{t} \begin{pmatrix} te^{mt}(m\sin(t) + \cos(t)) - 21e^{mt}\sin(t) - 24\cos(mt) + 24 \\ -mt\sin(mt) + 16e^{mt}\sin(t) + 19\cos(mt) - 19 \end{pmatrix},$$

and

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{mt}\sin(t) - 1.5t^5 \\ \cos(mt) + t^5 - 1 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(mt) - 1 \\ e^{mt}\sin(t) \end{pmatrix}.$$

Again, for the solution x_1 to be continuous we require

$$Qx_1(0) = 0 \ \Leftrightarrow\ 2x_{11}(0) + 3x_{12}(0) = 0.$$

The quantity Sx_1 needs to be prescribed at $t = 1$

$$x_{11}(1) + x_{12}(1) = e^m\sin(1) + \cos(m) - 1.5.$$

For x_2 we can prescribe the following consistency condition

$$B_{22}x_2(t) + B_{21}x_1(t) = g_2(t)$$

to hold either at $t = 0$ or $t = 1$.

Problem 4.4m1 Let $m = -1$. Then the system (2.12) has the form

$$x_1'(t) = \begin{pmatrix} 21 & 24 \\ -16 & -19 \end{pmatrix} x_1(t) + \frac{1}{t} \begin{pmatrix} te^{-t}(-\sin(t) + \cos(t)) - 21e^{-t}\sin(t) - 24\cos(t) + 24 \\ -t\sin(t) + 16e^{-t}\sin(t) + 19\cos(t) - 19 \end{pmatrix}.$$

Solution:

$$x_1 = \begin{pmatrix} x_{11} \\ x_{12} \end{pmatrix} = \begin{pmatrix} e^{-t}\sin(t) - 1.5t^5 \\ \cos(t) + t^5 - 1 \end{pmatrix}, \quad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \end{pmatrix} = \begin{pmatrix} \cos(t) - 1 \\ e^{-t}\sin(t) \end{pmatrix}.$$

System of DAEs:

$$\begin{aligned} tx_1'(t) + B_{11}x_1(t) + B_{12}x_2(t) &= g_1(t), \\ B_{21}x_1(t) + B_{22}x_2(t) &= g_2(t), \end{aligned}$$

with

$$B_{11} = \begin{pmatrix} -8 & -15 \\ 10 & 17 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22} = \begin{pmatrix} \frac{1}{7} & 0 \\ 0 & \frac{1}{4} \end{pmatrix},$$

and right-hand side

$$g_1(t) = \begin{pmatrix} te^{-t}(-\sin(t) + \cos(t)) - 9e^{-t}\sin(t) - 12\cos(t) - 10.5t^5 + 12 \\ -t\sin(t) + 11e^{-t}\sin(t) + 15\cos(t) + 7t^5 - 15 \end{pmatrix},$$

$$g_2(t) = \begin{pmatrix} e^{-t}\sin(t) + \frac{8}{7}\cos(t) - 0.5t^5 - \frac{8}{7} \\ \frac{9}{4}\,e^{-t}\sin(t) + 3\cos(t) - 3 \end{pmatrix}.$$

Boundary conditions (ewa) for Gauss and Radau collocation:
We require

$$Qx_1(0) = 0 \ \Leftrightarrow\ 2x_{11}(0) + 3x_{12}(0) = 0.$$

The quantity Sx_1 needs to be prescribed at $t = 1$

$$Sx_1(1) = x_{11}(1) + x_{12}(1) = e^{-1}\sin(1) + \cos(1) - 1.5.$$

The consistency conditions for x_2 read $B_{22}x_2(0) + B_{21}x_1(0) = g_2(0)$, or equivalently,

$$\begin{pmatrix} \frac{1}{7} & 0 \\ 0 & \frac{1}{4} \end{pmatrix} x_2(0) + \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix} x_1(0) = \begin{pmatrix} 0 \\ 0 \end{pmatrix}.$$

See Tables 187 to 191 for the numerical results.

All experiments for the semi-explicit Problems 4.1 to 4.4 show convergence rates which do not differ from those which we already saw for the regular problems and problems 1.11, 1.22, 1.41, and 1.42 with singularity of the first kind. It is worth mentioning that collocation at Gaussian points proves robust for all combinations of the eigenvalues of the matrix M. For the Radau points one can see that the superconvergence order does not always hold, cf. Example 4.2, Table 180 for $m = 4$.

2.6.2 Problems with unbounded canonical projector, B_{22} singular

Problem 4.5

The system (2.11) can be written in the form

$$A(t)(D(t)x(t))' + B(t)x(t) = g(t)$$

with

$$A(t) = \begin{pmatrix} tI \\ 0 \end{pmatrix}, \quad D(t) = (\, I \;\; 0\,).$$

The following example is a modification of Example 4, where

$$A(t) = \begin{pmatrix} t^\alpha I \\ 0 \end{pmatrix}, \quad \alpha \geq 0, \quad D = (\, I \;\; 0\,), \quad D^- = \begin{pmatrix} I \\ 0 \end{pmatrix}, \quad Q_0 = \begin{pmatrix} 0 & 0 \\ 0 & I \end{pmatrix}.$$

The matrix $B(t)$ has the form

$$B(t) = \begin{pmatrix} B_{11}(t) & B_{12}(t) \\ B_{21}(t) & B_{22}(t) \end{pmatrix},$$

where $B_{22}(t) = t^\beta E(t)$, $\beta > 0$, $\alpha + \beta = 1$, and $E(t)$ nonsingular. In this setting

$$G_1(t) = \begin{pmatrix} t^\alpha I & B_{12}(t) \\ 0 & B_{22}(t) \end{pmatrix},$$

$$G_1^{-1}(t) = \begin{pmatrix} \frac{1}{t^\alpha} I & -\frac{1}{t^{\alpha+\beta}} B_{12}(t) E^{-1}(t) \\ 0 & \frac{1}{t^\beta} E^{-1}(t) \end{pmatrix} = \begin{pmatrix} \frac{1}{t^\alpha} I & -\frac{1}{t} B_{12}(t) E^{-1}(t) \\ 0 & \frac{1}{t^\beta} E^{-1}(t) \end{pmatrix}$$

which means that tG_1^{-1} has a continuous extension to $[0, 1]$ in case that all involved matrices are continuous on $[0, 1]$. However, the canonical projector

$$Q_{can}(t) = Q_0 G_1^{-1}(t) B(t) = \begin{pmatrix} 0 & 0 \\ \frac{1}{t^\beta} E^{-1}(t) B_{21}(t) & I \end{pmatrix} \tag{2.21}$$

is unbounded on $[0, 1]$ for $\beta > 0$. Moreover,

$$DG_1^{-1}(t)B(t)D^- = \frac{1}{t^\alpha} B_{11}(t) - \frac{1}{t} B_{12}(t) E^{-1}(t) B_{21}(t) = \frac{1}{t}\big(t^\beta B_{11}(t) - B_{12}(t) E^{-1}(t) B_{21}(t)\big),$$

and hence

$$M(t) = -t^\beta B_{11}(t) + B_{12}(t) E^{-1}(t) B_{21}(t), \;\; M(0) = B_{12}(0) E^{-1}(0) B_{21}(0).$$

For the experiment we choose the matrices $B_{12}(t), E(t), B_{21}(t)$ to be constant and the matrices E, B_{21} to be nonsingular. Moreover, with the choice $B_{12} = B_{21}^{-1}$ and $E^{-1} = \mathrm{diag}(\lambda_1, \lambda_2)$, $\lambda_i \neq 0$, the eigenvalues of $M(0)$ are λ_1 and λ_2. Consequently, since $M(0)$ is nonsingular, $R = 0$, and the matrix $Q_0 G_1^{-1}(t) B(t) D^- R = 0$ has a continuous extension on $[0, 1]$. The matrices B_{ij} are

$$B_{11} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}, \quad B_{12} = \begin{pmatrix} 3 & -1 \\ -2 & 1 \end{pmatrix}, \quad B_{21} = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}, \quad B_{22}(t) = \begin{pmatrix} t^\beta & 0 \\ 0 & \frac{t^\beta}{5} \end{pmatrix}.$$

Finally,

$$E = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{5} \end{pmatrix}, \;\; E^{-1} = \begin{pmatrix} 1 & 0 \\ 0 & 5 \end{pmatrix}, \;\; M(0) = B_{12} E^{-1} B_{21} = \begin{pmatrix} -7 & -12 \\ 8 & 13 \end{pmatrix}.$$

For the right-hand side given by

$$g(t) = \begin{pmatrix} t^\alpha \sin(t) + (3 + t^{\alpha+1}) \cos(t) - t^\ell e^{-t} \\ -2\cos(t) + t^\ell e^{-t} + (t^\alpha + t^{\alpha+1}) e^t \\ t\sin(t) + t^\beta \cos(t) + te^t \\ 2t\sin(t) + \frac{t^{\beta+\ell}}{5} e^{-t} + 3te^t \end{pmatrix}, \quad \ell \geq \alpha.$$

the solution has the form

$$x(t) = \begin{pmatrix} t\sin(t) \\ te^t \\ \cos(t) \\ t^\ell e^{-t} \end{pmatrix}.$$

With this example we intend to study the influence of the fact that $Q_{can}(t)$ is unbounded for $t \to 0$. The parameter sets are given below. All results have been obtained by running our new MATLAB code `bvpsuite` applied to solve the enlarged system (1.2).

Boundary conditions (ewa) for equidistant and Gauss collocation:
We require

$$\begin{aligned} &x_1(1) = \sin(1), \quad x_2(1) = e^1, \\ &x_1(1) + x_2(1) + x_3(1) = \sin(1) + e^1 + \cos(1), \\ &2x_1(1) + 3x_2(1) + \frac{1}{5} x_4(1) = 2\sin(1) + 3e^1 + \frac{1}{5} e^{-1}. \end{aligned}$$

Since the eigenvalues of $M(0)$ are both positive, we prescribe the values of the differential components $x_1(t)$ and $x_2(t)$ at $t = 1$. The remaining two conditions are consistent boundary conditions for the algebraic components.

Problem 4.5013 We first chose $\alpha = 0$, $\beta = 1$, $\ell = 3$. The numerical results for this example can be found in Tables 192 to 200. We report the convergence results for each component of the solution $x(t)$. No order reductions are observed, although the projection matrix (2.21) is unbounded for $t \to 0$ ($\beta = 1$).

Problem 4.50132 Here, $\alpha = 0$, $\beta = 1$, $\ell = 3/2$. See Tables 201 to 209 for the convergence rates. We observe order reductions in the fourth component $x_4(t)$ due to the unsmoothness of its higher derivatives.

Example 4.512123 Now we set $\alpha = 1/2$, $\beta = 1/2$, $\ell = 3$. For the numerical experiments cf. Tables 210 to 218. For this example again, no order reductions can be observed.

Here, the differential solution components, $u(t)$, are smooth.

Problem 4.6
We use the same data as in Example 4.5 except for the right-hand side,

$$g(t) = \begin{pmatrix} \gamma t^{\alpha+\gamma-1} \sin(t) + (3 + t^{\alpha+\gamma}) \cos(t) - t^\ell e^{-t} \\ -2\cos(t) + t^\ell e^{-t} + (t^{\alpha+\delta} + \delta t^{\alpha+\delta-1}) e^t \\ t^\gamma \sin(t) + t^\beta \cos(t) + t^\delta e^t \\ 2t^\gamma \sin(t) + \frac{t^{\beta+\ell}}{5} e^{-t} + 3t^\delta e^t \end{pmatrix},$$

with $\ell \geq \alpha \geq 0$, $\alpha + \beta = 1$, $\beta > 0$, $\delta \geq 1$, $\gamma \geq 0$, $\gamma + \alpha \geq 0$. For this setting condition (1.5) is satisfied. The solution has now the form

$$x(t) = \begin{pmatrix} t^\gamma \sin(t) \\ t^\delta e^t \\ \cos(t) \\ t^\ell e^{-t} \end{pmatrix}.$$

We continue to study the influence of the unbounded canonical projector $Q_{can}(t)$. Here, we set $\alpha = 0$ and $\beta = 1$. The remaining parameters are specified below. The test runs have been carried out with `bvpsuite`.

Boundary conditions (ewa) for equidistant and Gauss collocation:
We require

$$
\begin{aligned}
&x_1(1) = \sin(1), \quad x_2(1) = e^1, \\
&x_1(1) + x_2(1) + x_3(1) = \sin(1) + e^1 + \cos(1), \\
&2x_1(1) + 3x_2(1) + \frac{1}{5}x_4(1) = 2\sin(1) + 3e^1 + \frac{1}{5}e^{-1}.
\end{aligned}
$$

Again, since the eigenvalues of $M(0)$ are both positive, we prescribe the values of the differential components $x_1(t)$ and $x_2(t)$ at $t = 1$. The remaining two conditions are consistent boundary conditions for the algebraic components.

Problem 4.6321532 We first chose $\ell = \frac{3}{2}$, $\gamma = \frac{1}{5}$, $\delta = \frac{3}{2}$. The numerical results for this example can be found in Tables 219 to 227. We report the convergence results for each component of the solution $x(t)$. Now we observe order reductions due to the fact that the canonical projector (2.21) is unbounded for $t \to 0$ ($\beta = 1$). Here, the differential solution components, $u(t)$, are unsmooth. One would expect to see the convergence order $O(h^{1.5})$ owing to the properties of x, especially the differential components. However, one looses approximately one additional power of h which can be attributed to the $O(1/t)$ behavior of $Q_{can}(t)$.

Problem 4.6526552 Now we set $\ell = \frac{5}{2}$, $\gamma = \frac{6}{5}$, $\delta = \frac{5}{2}$. The respective numerical results are reported in Tables 228 to 236 for each component of $x(t)$. We again observe order reductions since the canonical projector (2.21) is unbounded for $t \to 0$ ($\beta = 1$). One would expect to see the convergence order $O(h^{2.5})$ owing to the properties of x, but one looses approximately one additional power of h, as above.

3 Collection of Tables

In Table 1 below, we recapitulate the convergence behavior for the solution x. The stage order is marked by ok, and n/a means not available. Since the examples with the singularity of second kind, 3.11 and 3.21, are non standard, we do not report on them in the table.

Problem	**File**	**Equidistant**	**Gauss**	**Radau**
0.11	`ewa011`	ok	ok	n/a
0.11	`maerz011`	ok	ok	
0.21	`ewa021`	ok	ok	n/a
0.21	`maerz021`	ok	ok	
0.311	`ewa0311`	ok	ok	n/a
0.311	`maerz0311`	ok	ok	n/a
0.312	`ewa0312`	ok	ok	n/a
0.313	`ewa0313`	ok	ok	n/a
0.411	`ewa0411`	ok	ok	
0.412	`ewa0412`	ok	ok	
0.413	`ewa0413`	ok	ok	
1.11	`ewa111`	ok	ok	n/a
1.21	`ewa121`	order reduction, (1.5) violated	order reduction, (1.5) violated	n/a
1.21	`ewa121bvpsuite`	order reduction, (1.5) violated	order reduction, (1.5) violated	n/a
1.22	`ewa122`	ok	ok	n/a
1.31	`ewa131`	order reduction, (1.5) violated	order reduction, (1.5) violated	n/a
1.31	`ewa131bvpsuite`	order reduction, (1.5) violated	order reduction, (1.5) violated	n/a
1.31	`maerz131`	order reduction, (1.5) violated	order reduction, (1.5) violated	n/a
1.41	`ewa141`	order reduction	order reduction	n/a
1.41	`ewa141bvpsuite`	ok	ok	n/a
1.42	`ewa142`	order reduction	order reduction	n/a
1.42	`ewa142bvpsuite`	ok	ok	n/a
4.1	`lin41`	ok	ok	n/a
4.2	`lin42`	ok	ok	
4.3	`lin43`	ok	ok	
4.4	`lin44`	ok	ok	
4.5	`ewa45013bvpsuite`	ok	ok	n/a
4.5	`ewa450132bvpsuite`	order reduction, solution unsmooth	order reduction, solution unsmooth	n/a
4.5	`ewa4512123bvpsuite`	ok	ok	n/a
4.6	`ewa46526552bvpsuite`	order reduction, solution unsmooth, unbounded projector	order reduction, solution unsmooth, unbounded projector	n/a
4.6	`ewa46321532bvpsuite`	order reduction, solution unsmooth, unbounded projector	order reduction, solution unsmooth, unbounded projector	n/a

Table 1: Overview of the convergence results

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.379e-03$			$7.379e-03$		
20	$5.00e-02$	$1.873e-03$	2.0	$7.018e-01$	$1.873e-03$	2.0	$7.018e-01$
40	$2.50e-02$	$4.718e-04$	2.0	$7.245e-01$	$4.718e-04$	2.0	$7.245e-01$
80	$1.25e-02$	$1.184e-04$	2.0	$7.394e-01$	$1.184e-04$	2.0	$7.394e-01$
160	$6.25e-03$	$2.966e-05$	2.0	$7.485e-01$	$2.966e-05$	2.0	$7.485e-01$
320	$3.13e-03$	$7.423e-06$	2.0	$7.539e-01$	$7.423e-06$	2.0	$7.539e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.666e-04$			$1.190e-03$		
20	$5.00e-02$	$1.165e-04$	2.0	$4.684e-02$	$3.048e-04$	2.0	$1.097e-01$
40	$2.50e-02$	$2.912e-05$	2.0	$4.665e-02$	$7.716e-05$	2.0	$1.156e-01$
80	$1.25e-02$	$7.281e-06$	2.0	$4.658e-02$	$1.941e-05$	2.0	$1.194e-01$
160	$6.25e-03$	$1.820e-06$	2.0	$4.661e-02$	$4.868e-06$	2.0	$1.218e-01$
320	$3.13e-03$	$4.551e-07$	2.0	$4.660e-02$	$1.219e-06$	2.0	$1.232e-01$

Table 2: Numerical experiment `ewa011` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.074e-04$			$2.074e-04$		
20	$5.00e-02$	$5.212e-05$	2.0	$2.036e-02$	$5.212e-05$	2.0	$2.036e-02$
40	$2.50e-02$	$1.303e-05$	2.0	$2.084e-02$	$1.303e-05$	2.0	$2.084e-02$
80	$1.25e-02$	$3.258e-06$	2.0	$2.085e-02$	$3.258e-06$	2.0	$2.085e-02$
160	$6.25e-03$	$8.145e-07$	2.0	$2.084e-02$	$8.145e-07$	2.0	$2.084e-02$
320	$3.13e-03$	$2.036e-07$	2.0	$2.085e-02$	$2.036e-07$	2.0	$2.085e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.014e-04$			$1.014e-04$		
20	$5.00e-02$	$2.535e-05$	2.0	$1.015e-02$	$2.535e-05$	2.0	$1.015e-02$
40	$2.50e-02$	$6.338e-06$	2.0	$1.014e-02$	$6.338e-06$	2.0	$1.014e-02$
80	$1.25e-02$	$1.584e-06$	2.0	$1.014e-02$	$1.584e-06$	2.0	$1.014e-02$
160	$6.25e-03$	$3.961e-07$	2.0	$1.014e-02$	$3.961e-07$	2.0	$1.014e-02$
320	$3.13e-03$	$9.903e-08$	2.0	$1.014e-02$	$9.903e-08$	2.0	$1.014e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.466e-04$			$1.466e-04$		
20	$5.00e-02$	$3.665e-05$	2.0	$1.464e-02$	$3.665e-05$	2.0	$1.464e-02$
40	$2.50e-02$	$9.164e-06$	2.0	$1.465e-02$	$9.164e-06$	2.0	$1.465e-02$
80	$1.25e-02$	$2.291e-06$	2.0	$1.465e-02$	$2.291e-06$	2.0	$1.465e-02$
160	$6.25e-03$	$5.728e-07$	2.0	$1.466e-02$	$5.728e-07$	2.0	$1.466e-02$
320	$3.13e-03$	$1.432e-07$	2.0	$1.466e-02$	$1.432e-07$	2.0	$1.466e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.952e-08$			$6.654e-06$		
20	$5.00e-02$	$3.713e-09$	4.0	$5.991e-04$	$8.377e-07$	3.0	$6.499e-03$
40	$2.50e-02$	$2.319e-10$	4.0	$5.953e-04$	$1.051e-07$	3.0	$6.602e-03$
80	$1.25e-02$	$1.451e-11$	4.0	$5.920e-04$	$1.316e-08$	3.0	$6.664e-03$
160	$6.25e-03$	$9.266e-13$	4.0	$5.175e-04$	$1.646e-09$	3.0	$6.701e-03$
320	$3.13e-03$	$1.056e-13$	3.1	$7.476e-06$	$2.058e-10$	3.0	$6.734e-03$

Table 3: Numerical experiment `ewa011` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.537e-06$			$1.537e-06$		
20	$5.00e-02$	$9.725e-08$	4.0	$1.477e-02$	$9.725e-08$	4.0	$1.477e-02$
40	$2.50e-02$	$6.116e-09$	4.0	$1.515e-02$	$6.116e-09$	4.0	$1.515e-02$
80	$1.25e-02$	$3.834e-10$	4.0	$1.542e-02$	$3.834e-10$	4.0	$1.542e-02$
160	$6.25e-03$	$2.652e-11$	3.9	$8.265e-03$	$2.652e-11$	3.9	$8.265e-03$
320	$3.13e-03$	$8.833e-12$	1.6	$8.308e-08$	$8.833e-12$	1.6	$8.308e-08$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.190e-08$			$1.422e-07$		
20	$5.00e-02$	$3.869e-09$	4.0	$6.189e-04$	$9.023e-09$	4.0	$1.353e-03$
40	$2.50e-02$	$2.419e-10$	4.0	$6.182e-04$	$5.681e-10$	4.0	$1.399e-03$
80	$1.25e-02$	$1.513e-11$	4.0	$6.157e-04$	$3.563e-11$	4.0	$1.427e-03$
160	$6.25e-03$	$9.581e-13$	4.0	$5.709e-04$	$2.229e-12$	4.0	$1.453e-03$
320	$3.13e-03$	$1.127e-13$	3.1	$6.130e-06$	$1.429e-13$	4.0	$1.212e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.282e-07$			$8.282e-07$		
20	$5.00e-02$	$5.233e-08$	4.0	$7.987e-03$	$5.233e-08$	4.0	$7.987e-03$
40	$2.50e-02$	$3.289e-09$	4.0	$8.174e-03$	$3.289e-09$	4.0	$8.174e-03$
80	$1.25e-02$	$2.062e-10$	4.0	$8.280e-03$	$2.062e-10$	4.0	$8.280e-03$
160	$6.25e-03$	$1.349e-11$	3.9	$6.334e-03$	$1.349e-11$	3.9	$6.334e-03$
320	$3.13e-03$	$2.258e-12$	2.6	$6.499e-06$	$2.258e-12$	2.6	$6.499e-06$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.428e-11$			$5.199e-08$		
20	$5.00e-02$	$2.514e-13$	5.8	$9.625e-06$	$3.254e-09$	4.0	$5.177e-04$
40	$2.50e-02$	$5.973e-14$	2.1	$1.252e-10$	$2.034e-10$	4.0	$5.199e-04$
80	$1.25e-02$	$9.903e-14$	-0.7	$4.051e-15$	$1.272e-11$	4.0	$5.205e-04$
160	$6.25e-03$	$1.903e-13$	-0.9	$1.594e-15$	$7.946e-13$	4.0	$5.213e-04$
320	$3.13e-03$	$4.015e-13$	-1.1	$8.045e-16$	$4.227e-13$	0.9	$8.080e-11$

Table 4: Numerical experiment `ewa011` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.820e-08$			$8.820e-08$		
20	$5.00e-02$	$5.517e-09$	4.0	$8.795e-04$	$5.517e-09$	4.0	$8.795e-04$
40	$2.50e-02$	$3.430e-10$	4.0	$9.026e-04$	$3.430e-10$	4.0	$9.026e-04$
80	$1.25e-02$	$2.416e-11$	3.8	$4.655e-04$	$2.416e-11$	3.8	$4.655e-04$
160	$6.25e-03$	$5.316e-12$	2.2	$3.460e-07$	$5.316e-12$	2.2	$3.460e-07$
320	$3.13e-03$	$1.518e-11$	-1.5	$2.454e-15$	$1.518e-11$	-1.5	$2.454e-15$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.706e-09$			$7.706e-09$		
20	$5.00e-02$	$4.816e-10$	4.0	$7.704e-05$	$4.816e-10$	4.0	$7.704e-05$
40	$2.50e-02$	$3.010e-11$	4.0	$7.711e-05$	$3.010e-11$	4.0	$7.711e-05$
80	$1.25e-02$	$1.855e-12$	4.0	$8.302e-05$	$1.855e-12$	4.0	$8.302e-05$
160	$6.25e-03$	$3.153e-14$	5.9	$2.855e-01$	$3.153e-14$	5.9	$2.855e-01$
320	$3.13e-03$	$2.665e-13$	-3.1	$5.153e-21$	$2.665e-13$	-3.1	$5.153e-21$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.281e-08$			$3.281e-08$		
20	$5.00e-02$	$2.053e-09$	4.0	$3.273e-04$	$2.053e-09$	4.0	$3.273e-04$
40	$2.50e-02$	$1.284e-10$	4.0	$3.269e-04$	$1.284e-10$	4.0	$3.269e-04$
80	$1.25e-02$	$6.349e-12$	4.3	$1.145e-03$	$6.349e-12$	4.3	$1.145e-03$
160	$6.25e-03$	$3.849e-12$	0.7	$1.504e-10$	$3.849e-12$	0.7	$1.504e-10$
320	$3.13e-03$	$8.084e-12$	-1.1	$1.681e-14$	$8.084e-12$	-1.1	$1.681e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.331e-15$			$2.006e-10$		
20	$5.00e-02$	$1.221e-15$	1.4	$9.332e-14$	$6.357e-12$	5.0	$1.914e-05$
40	$2.50e-02$	$1.443e-15$	-0.2	$5.933e-16$	$2.012e-13$	5.0	$1.927e-05$
80	$1.25e-02$	$6.883e-15$	-2.3	$3.538e-19$	$1.343e-14$	3.9	$3.621e-07$
160	$6.25e-03$	$1.799e-14$	-1.4	$1.588e-17$	$1.821e-14$	-0.4	$1.965e-15$
320	$3.13e-03$	$2.098e-14$	-0.2	$5.818e-15$	$2.109e-14$	-0.2	$6.199e-15$

Table 5: Numerical experiment `ewa011` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.658e-11$			$9.658e-11$		
20	$5.00e-02$	$1.552e-12$	6.0	$8.803e-05$	$1.552e-12$	6.0	$8.803e-05$
40	$2.50e-02$	$3.134e-12$	-1.0	$7.431e-14$	$3.134e-12$	-1.0	$7.431e-14$
80	$1.25e-02$	$1.877e-11$	-2.6	$2.285e-16$	$1.877e-11$	-2.6	$2.285e-16$
160	$6.25e-03$	$2.657e-11$	-0.5	$2.089e-12$	$2.657e-11$	-0.5	$2.089e-12$
320	$3.13e-03$	$5.178e-11$	-1.0	$2.008e-13$	$5.178e-11$	-1.0	$2.008e-13$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.117e-12$			$6.924e-12$		
20	$5.00e-02$	$5.373e-14$	5.9	$2.248e-06$	$1.099e-13$	6.0	$6.572e-06$
40	$2.50e-02$	$2.354e-14$	1.2	$1.904e-12$	$2.354e-14$	2.2	$8.584e-11$
80	$1.25e-02$	$4.297e-14$	-0.9	$9.566e-16$	$4.297e-14$	-0.9	$9.566e-16$
160	$6.25e-03$	$5.973e-14$	-0.5	$5.353e-15$	$5.973e-14$	-0.5	$5.353e-15$
320	$3.13e-03$	$1.104e-13$	-0.9	$6.670e-16$	$1.104e-13$	-0.9	$6.670e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa011	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.487e-11$			$2.487e-11$		
20	$5.00e-02$	$3.681e-13$	6.1	$2.979e-05$	$3.681e-13$	6.1	$2.979e-05$
40	$2.50e-02$	$6.624e-13$	-0.8	$2.908e-14$	$6.624e-13$	-0.8	$2.908e-14$
80	$1.25e-02$	$4.241e-13$	0.6	$7.104e-12$	$4.241e-13$	0.6	$7.104e-12$
160	$6.25e-03$	$3.824e-12$	-3.2	$3.891e-19$	$3.824e-12$	-3.2	$3.891e-19$
320	$3.13e-03$	$1.018e-11$	-1.4	$2.940e-15$	$1.018e-11$	-1.4	$2.940e-15$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.438e-15$			$1.033e-12$		
20	$5.00e-02$	$1.099e-14$	-0.6	$2.033e-15$	$2.220e-14$	5.5	$3.575e-07$
40	$2.50e-02$	$1.577e-14$	-0.5	$2.312e-15$	$1.577e-14$	0.5	$9.756e-14$
80	$1.25e-02$	$4.052e-14$	-1.4	$1.037e-16$	$4.052e-14$	-1.4	$1.037e-16$
160	$6.25e-03$	$9.914e-14$	-1.3	$1.417e-16$	$9.914e-14$	-1.3	$1.417e-16$
320	$3.13e-03$	$2.092e-13$	-1.1	$4.191e-16$	$2.092e-13$	-1.1	$4.191e-16$

Table 6: Numerical experiment `ewa011` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.008e-03$			$6.008e-03$		
20	$5.00e-02$	$1.533e-03$	2.0	$5.619e-01$	$1.533e-03$	2.0	$5.619e-01$
40	$2.50e-02$	$3.872e-04$	2.0	$5.861e-01$	$3.872e-04$	2.0	$5.861e-01$
80	$1.25e-02$	$9.730e-05$	2.0	$6.023e-01$	$9.730e-05$	2.0	$6.023e-01$
160	$6.25e-03$	$2.439e-05$	2.0	$6.123e-01$	$2.439e-05$	2.0	$6.123e-01$
320	$3.13e-03$	$6.106e-06$	2.0	$6.183e-01$	$6.106e-06$	2.0	$6.183e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.025e-03$			$2.166e-03$		
20	$5.00e-02$	$2.558e-04$	2.0	$1.031e-01$	$5.544e-04$	2.0	$2.003e-01$
40	$2.50e-02$	$6.391e-05$	2.0	$1.025e-01$	$1.403e-04$	2.0	$2.104e-01$
80	$1.25e-02$	$1.598e-05$	2.0	$1.023e-01$	$3.529e-05$	2.0	$2.172e-01$
160	$6.25e-03$	$3.994e-06$	2.0	$1.023e-01$	$8.849e-06$	2.0	$2.214e-01$
320	$3.13e-03$	$9.985e-07$	2.0	$1.022e-01$	$2.216e-06$	2.0	$2.240e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.099e-02$			$6.099e-02$		
20	$5.00e-02$	$3.169e-02$	0.9	$5.369e-01$	$3.169e-02$	0.9	$5.369e-01$
40	$2.50e-02$	$1.616e-02$	1.0	$5.815e-01$	$1.616e-02$	1.0	$5.815e-01$
80	$1.25e-02$	$8.164e-03$	1.0	$6.125e-01$	$8.164e-03$	1.0	$6.125e-01$
160	$6.25e-03$	$4.103e-03$	1.0	$6.323e-01$	$4.103e-03$	1.0	$6.323e-01$
320	$3.13e-03$	$2.057e-03$	1.0	$6.442e-01$	$2.057e-03$	1.0	$6.442e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.099e-02$			$6.099e-02$		
20	$5.00e-02$	$3.169e-02$	0.9	$5.369e-01$	$3.169e-02$	0.9	$5.369e-01$
40	$2.50e-02$	$1.616e-02$	1.0	$5.815e-01$	$1.616e-02$	1.0	$5.815e-01$
80	$1.25e-02$	$8.164e-03$	1.0	$6.125e-01$	$8.164e-03$	1.0	$6.125e-01$
160	$6.25e-03$	$4.103e-03$	1.0	$6.323e-01$	$4.103e-03$	1.0	$6.323e-01$
320	$3.13e-03$	$2.057e-03$	1.0	$6.442e-01$	$2.057e-03$	1.0	$6.442e-01$

Table 7: Numerical experiment `maerz011` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.353e-04$			$2.353e-04$		
20	$5.00e-02$	$5.881e-05$	2.0	$2.353e-02$	$5.881e-05$	2.0	$2.353e-02$
40	$2.50e-02$	$1.470e-05$	2.0	$2.353e-02$	$1.470e-05$	2.0	$2.353e-02$
80	$1.25e-02$	$3.676e-06$	2.0	$2.352e-02$	$3.676e-06$	2.0	$2.352e-02$
160	$6.25e-03$	$9.189e-07$	2.0	$2.352e-02$	$9.189e-07$	2.0	$2.352e-02$
320	$3.13e-03$	$2.297e-07$	2.0	$2.352e-02$	$2.297e-07$	2.0	$2.352e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.353e-04$			$2.353e-04$		
20	$5.00e-02$	$5.881e-05$	2.0	$2.353e-02$	$5.881e-05$	2.0	$2.353e-02$
40	$2.50e-02$	$1.470e-05$	2.0	$2.353e-02$	$1.470e-05$	2.0	$2.353e-02$
80	$1.25e-02$	$3.676e-06$	2.0	$2.352e-02$	$3.676e-06$	2.0	$2.352e-02$
160	$6.25e-03$	$9.189e-07$	2.0	$2.352e-02$	$9.189e-07$	2.0	$2.352e-02$
320	$3.13e-03$	$2.297e-07$	2.0	$2.352e-02$	$2.297e-07$	2.0	$2.352e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.677e-05$			$8.677e-05$		
20	$5.00e-02$	$2.172e-05$	2.0	$8.634e-03$	$2.172e-05$	2.0	$8.634e-03$
40	$2.50e-02$	$5.433e-06$	2.0	$8.676e-03$	$5.433e-06$	2.0	$8.676e-03$
80	$1.25e-02$	$1.358e-06$	2.0	$8.689e-03$	$1.358e-06$	2.0	$8.689e-03$
160	$6.25e-03$	$3.396e-07$	2.0	$8.692e-03$	$3.396e-07$	2.0	$8.692e-03$
320	$3.13e-03$	$8.490e-08$	2.0	$8.695e-03$	$8.490e-08$	2.0	$8.695e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.762e-08$			$6.697e-06$		
20	$5.00e-02$	$6.081e-09$	4.0	$9.868e-04$	$8.403e-07$	3.0	$6.611e-03$
40	$2.50e-02$	$3.798e-10$	4.0	$9.762e-04$	$1.052e-07$	3.0	$6.669e-03$
80	$1.25e-02$	$2.376e-11$	4.0	$9.675e-04$	$1.317e-08$	3.0	$6.702e-03$
160	$6.25e-03$	$1.548e-12$	3.9	$7.492e-04$	$1.647e-09$	3.0	$6.722e-03$
320	$3.13e-03$	$2.287e-13$	2.8	$1.861e-06$	$2.059e-10$	3.0	$6.733e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.791e-05$			$2.073e-05$		
20	$5.00e-02$	$2.233e-06$	3.0	$1.808e-02$	$2.593e-06$	3.0	$2.067e-02$
40	$2.50e-02$	$2.788e-07$	3.0	$1.796e-02$	$3.244e-07$	3.0	$2.069e-02$
80	$1.25e-02$	$3.482e-08$	3.0	$1.790e-02$	$4.056e-08$	3.0	$2.072e-02$
160	$6.25e-03$	$4.352e-09$	3.0	$1.786e-02$	$5.071e-09$	3.0	$2.074e-02$
320	$3.13e-03$	$5.439e-10$	3.0	$1.783e-02$	$6.340e-10$	3.0	$2.076e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.791e-05$			$2.073e-05$		
20	$5.00e-02$	$2.233e-06$	3.0	$1.808e-02$	$2.593e-06$	3.0	$2.067e-02$
40	$2.50e-02$	$2.788e-07$	3.0	$1.796e-02$	$3.244e-07$	3.0	$2.069e-02$
80	$1.25e-02$	$3.482e-08$	3.0	$1.790e-02$	$4.056e-08$	3.0	$2.072e-02$
160	$6.25e-03$	$4.352e-09$	3.0	$1.786e-02$	$5.071e-09$	3.0	$2.074e-02$
320	$3.13e-03$	$5.439e-10$	3.0	$1.783e-02$	$6.340e-10$	3.0	$2.076e-02$

Table 8: Numerical experiment `maerz011` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.153e-06$			$1.153e-06$		
20	$5.00e-02$	$7.297e-08$	4.0	$1.105e-02$	$7.297e-08$	4.0	$1.105e-02$
40	$2.50e-02$	$4.593e-09$	4.0	$1.133e-02$	$4.593e-09$	4.0	$1.133e-02$
80	$1.25e-02$	$2.847e-10$	4.0	$1.228e-02$	$2.847e-10$	4.0	$1.228e-02$
160	$6.25e-03$	$1.999e-11$	3.8	$5.592e-03$	$1.999e-11$	3.8	$5.592e-03$
320	$3.13e-03$	$4.150e-11$	-1.1	$9.495e-14$	$4.150e-11$	-1.1	$9.495e-14$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.415e-07$			$2.802e-07$		
20	$5.00e-02$	$8.839e-09$	4.0	$1.417e-03$	$1.775e-08$	4.0	$2.679e-03$
40	$2.50e-02$	$5.524e-10$	4.0	$1.415e-03$	$1.117e-09$	4.0	$2.759e-03$
80	$1.25e-02$	$3.456e-11$	4.0	$1.406e-03$	$7.009e-11$	4.0	$2.801e-03$
160	$6.25e-03$	$2.177e-12$	4.0	$1.347e-03$	$4.404e-12$	4.0	$2.776e-03$
320	$3.13e-03$	$2.487e-13$	3.1	$1.725e-05$	$3.849e-13$	3.5	$2.476e-04$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.143e-07$			$6.143e-07$		
20	$5.00e-02$	$3.891e-08$	4.0	$5.877e-03$	$3.891e-08$	4.0	$5.877e-03$
40	$2.50e-02$	$2.449e-09$	4.0	$6.037e-03$	$2.449e-09$	4.0	$6.037e-03$
80	$1.25e-02$	$1.537e-10$	4.0	$6.135e-03$	$1.537e-10$	4.0	$6.135e-03$
160	$6.25e-03$	$6.639e-12$	4.5	$6.509e-02$	$6.639e-12$	4.5	$6.509e-02$
320	$3.13e-03$	$3.285e-12$	1.0	$1.147e-09$	$3.285e-12$	1.0	$1.147e-09$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.314e-11$			$5.203e-08$		
20	$5.00e-02$	$5.840e-13$	5.8	$2.222e-05$	$3.254e-09$	4.0	$5.188e-04$
40	$2.50e-02$	$1.397e-13$	2.1	$2.829e-10$	$2.036e-10$	4.0	$5.188e-04$
80	$1.25e-02$	$2.303e-13$	-0.7	$9.762e-15$	$1.294e-11$	4.0	$4.754e-04$
160	$6.25e-03$	$4.436e-13$	-0.9	$3.644e-15$	$1.237e-12$	3.4	$3.616e-05$
320	$3.13e-03$	$9.448e-13$	-1.1	$1.751e-15$	$9.930e-13$	0.3	$6.186e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.207e-10$			$1.102e-07$		
20	$5.00e-02$	$1.343e-11$	5.0	$3.916e-05$	$6.975e-09$	4.0	$1.055e-03$
40	$2.50e-02$	$4.416e-13$	4.9	$3.453e-05$	$4.387e-10$	4.0	$1.086e-03$
80	$1.25e-02$	$1.299e-13$	1.8	$2.976e-10$	$2.758e-11$	4.0	$1.090e-03$
160	$6.25e-03$	$2.536e-13$	-1.0	$1.892e-15$	$1.885e-12$	3.9	$6.419e-04$
320	$3.13e-03$	$6.388e-13$	-1.3	$2.924e-16$	$6.639e-13$	1.5	$3.916e-09$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.207e-10$			$1.102e-07$		
20	$5.00e-02$	$1.343e-11$	5.0	$3.916e-05$	$6.975e-09$	4.0	$1.055e-03$
40	$2.50e-02$	$4.416e-13$	4.9	$3.453e-05$	$4.387e-10$	4.0	$1.086e-03$
80	$1.25e-02$	$7.727e-14$	2.5	$4.721e-09$	$2.758e-11$	4.0	$1.090e-03$
160	$6.25e-03$	$1.632e-13$	-1.1	$6.843e-16$	$1.885e-12$	3.9	$6.419e-04$
320	$3.13e-03$	$3.400e-13$	-1.1	$7.574e-16$	$4.475e-13$	2.1	$7.031e-08$

Table 9: Numerical experiment `maerz011` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.820e-08$			$8.820e-08$		
20	$5.00e-02$	$5.518e-09$	4.0	$8.790e-04$	$5.518e-09$	4.0	$8.790e-04$
40	$2.50e-02$	$3.449e-10$	4.0	$8.826e-04$	$3.449e-10$	4.0	$8.826e-04$
80	$1.25e-02$	$1.965e-11$	4.1	$1.447e-03$	$1.965e-11$	4.1	$1.447e-03$
160	$6.25e-03$	$1.122e-11$	0.8	$6.786e-10$	$1.122e-11$	0.8	$6.786e-10$
320	$3.13e-03$	$4.940e-11$	-2.1	$2.170e-16$	$4.940e-11$	-2.1	$2.170e-16$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.788e-08$			$1.788e-08$		
20	$5.00e-02$	$1.117e-09$	4.0	$1.787e-04$	$1.117e-09$	4.0	$1.787e-04$
40	$2.50e-02$	$6.982e-11$	4.0	$1.789e-04$	$6.982e-11$	4.0	$1.789e-04$
80	$1.25e-02$	$4.284e-12$	4.0	$1.972e-04$	$4.284e-12$	4.0	$1.972e-04$
160	$6.25e-03$	$4.896e-14$	6.5	$8.112e+00$	$4.929e-14$	6.4	$7.772e+00$
320	$3.13e-03$	$5.631e-13$	-3.5	$8.379e-22$	$5.648e-13$	-3.5	$8.676e-22$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.281e-08$			$3.281e-08$		
20	$5.00e-02$	$2.052e-09$	4.0	$3.274e-04$	$2.052e-09$	4.0	$3.274e-04$
40	$2.50e-02$	$1.285e-10$	4.0	$3.253e-04$	$1.285e-10$	4.0	$3.253e-04$
80	$1.25e-02$	$6.936e-12$	4.2	$7.197e-04$	$6.936e-12$	4.2	$7.197e-04$
160	$6.25e-03$	$1.765e-12$	2.0	$3.974e-08$	$1.765e-12$	2.0	$3.974e-08$
320	$3.13e-03$	$7.131e-12$	-2.0	$6.394e-17$	$7.131e-12$	-2.0	$6.394e-17$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.108e-15$			$2.006e-10$		
20	$5.00e-02$	$2.887e-15$	0.5	$1.326e-14$	$6.358e-12$	5.0	$1.913e-05$
40	$2.50e-02$	$1.554e-15$	0.9	$4.191e-14$	$2.002e-13$	5.0	$1.970e-05$
80	$1.25e-02$	$2.542e-14$	-4.0	$5.399e-22$	$2.542e-14$	3.0	$1.177e-08$
160	$6.25e-03$	$2.998e-14$	-0.2	$8.975e-15$	$3.009e-14$	-0.2	$8.768e-15$
320	$3.13e-03$	$1.754e-14$	0.8	$1.516e-12$	$1.787e-14$	0.8	$1.362e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.894e-14$			$3.927e-10$		
20	$5.00e-02$	$1.810e-13$	-1.4	$2.794e-15$	$1.246e-11$	5.0	$3.729e-05$
40	$2.50e-02$	$3.604e-13$	-1.0	$9.218e-15$	$3.898e-13$	5.0	$3.974e-05$
80	$1.25e-02$	$8.742e-13$	-1.3	$3.226e-15$	$8.906e-13$	-1.2	$4.798e-15$
160	$6.25e-03$	$1.520e-12$	-0.8	$2.644e-14$	$1.537e-12$	-0.8	$2.831e-14$
320	$3.13e-03$	$3.277e-12$	-1.1	$5.494e-15$	$3.293e-12$	-1.1	$5.792e-15$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.894e-14$			$3.927e-10$		
20	$5.00e-02$	$1.796e-13$	-1.4	$2.864e-15$	$1.246e-11$	5.0	$3.729e-05$
40	$2.50e-02$	$3.599e-13$	-1.0	$8.910e-15$	$3.898e-13$	5.0	$3.974e-05$
80	$1.25e-02$	$7.077e-13$	-1.0	$9.856e-15$	$7.077e-13$	-0.9	$1.631e-14$
160	$6.25e-03$	$1.411e-12$	-1.0	$9.014e-15$	$1.411e-12$	-1.0	$9.014e-15$
320	$3.13e-03$	$2.838e-12$	-1.0	$8.477e-15$	$2.838e-12$	-1.0	$8.477e-15$

Table 10: Numerical experiment `maerz011` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.659e-10$			$1.659e-10$		
20	$5.00e-02$	$6.700e-12$	4.6	$7.084e-06$	$6.700e-12$	4.6	$7.084e-06$
40	$2.50e-02$	$6.038e-12$	0.2	$1.050e-11$	$6.038e-12$	0.2	$1.050e-11$
80	$1.25e-02$	$7.579e-12$	-0.3	$1.801e-12$	$7.579e-12$	-0.3	$1.801e-12$
160	$6.25e-03$	$4.095e-11$	-2.4	$1.770e-16$	$4.095e-11$	-2.4	$1.770e-16$
320	$3.13e-03$	$8.920e-11$	-1.1	$1.370e-13$	$8.920e-11$	-1.1	$1.370e-13$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.195e-12$			$1.400e-11$		
20	$5.00e-02$	$1.300e-13$	5.8	$4.439e-06$	$2.388e-13$	5.9	$1.046e-05$
40	$2.50e-02$	$8.882e-14$	0.5	$6.747e-13$	$9.015e-14$	1.4	$1.609e-11$
80	$1.25e-02$	$1.631e-13$	-0.9	$3.498e-15$	$1.631e-13$	-0.9	$3.844e-15$
160	$6.25e-03$	$6.062e-14$	1.4	$8.507e-11$	$6.062e-14$	1.4	$8.507e-11$
320	$3.13e-03$	$2.419e-13$	-2.0	$2.408e-18$	$2.419e-13$	-2.0	$2.408e-18$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.131e-11$			$4.131e-11$		
20	$5.00e-02$	$6.857e-13$	5.9	$3.378e-05$	$6.857e-13$	5.9	$3.378e-05$
40	$2.50e-02$	$3.590e-13$	0.9	$1.123e-11$	$3.590e-13$	0.9	$1.123e-11$
80	$1.25e-02$	$2.570e-12$	-2.8	$1.014e-17$	$2.570e-12$	-2.8	$1.014e-17$
160	$6.25e-03$	$9.622e-12$	-1.9	$6.102e-16$	$9.622e-12$	-1.9	$6.102e-16$
320	$3.13e-03$	$1.929e-11$	-1.0	$5.918e-14$	$1.929e-11$	-1.0	$5.918e-14$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.554e-14$			$1.047e-12$		
20	$5.00e-02$	$2.975e-14$	-0.9	$1.798e-15$	$4.607e-14$	4.5	$3.364e-08$
40	$2.50e-02$	$4.197e-14$	-0.5	$6.730e-15$	$4.241e-14$	0.1	$6.591e-14$
80	$1.25e-02$	$8.538e-14$	-1.0	$9.582e-16$	$8.593e-14$	-1.0	$9.894e-16$
160	$6.25e-03$	$2.149e-13$	-1.3	$2.491e-16$	$2.149e-13$	-1.3	$2.612e-16$
320	$3.13e-03$	$4.451e-13$	-1.1	$1.041e-15$	$4.453e-13$	-1.1	$1.038e-15$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz011	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.429e-13$			$2.785e-12$		
20	$5.00e-02$	$1.638e-12$	-1.0	$9.279e-14$	$1.647e-12$	0.8	$1.593e-11$
40	$2.50e-02$	$3.224e-12$	-1.0	$8.770e-14$	$3.224e-12$	-1.0	$9.046e-14$
80	$1.25e-02$	$6.406e-12$	-1.0	$8.341e-14$	$6.406e-12$	-1.0	$8.341e-14$
160	$6.25e-03$	$1.276e-11$	-1.0	$8.235e-14$	$1.280e-11$	-1.0	$8.063e-14$
320	$3.13e-03$	$2.577e-11$	-1.0	$7.402e-14$	$2.577e-11$	-1.0	$7.611e-14$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.422e-13$			$2.785e-12$		
20	$5.00e-02$	$1.637e-12$	-1.0	$9.258e-14$	$1.647e-12$	0.8	$1.593e-11$
40	$2.50e-02$	$3.223e-12$	-1.0	$8.761e-14$	$3.223e-12$	-1.0	$9.053e-14$
80	$1.25e-02$	$6.406e-12$	-1.0	$8.335e-14$	$6.406e-12$	-1.0	$8.335e-14$
160	$6.25e-03$	$1.275e-11$	-1.0	$8.233e-14$	$1.275e-11$	-1.0	$8.233e-14$
320	$3.13e-03$	$2.548e-11$	-1.0	$8.036e-14$	$2.548e-11$	-1.0	$8.036e-14$

Table 11: Numerical experiment `maerz011` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **`tau`**			Error for $\boldsymbol{x}$ at Mesh **`tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.665e-02$			$2.665e-02$		
20	$5.00e-02$	$6.671e-03$	2.0	$2.651e+00$	$6.671e-03$	2.0	$2.651e+00$
40	$2.50e-02$	$1.669e-03$	2.0	$2.664e+00$	$1.669e-03$	2.0	$2.664e+00$
80	$1.25e-02$	$4.172e-04$	2.0	$2.668e+00$	$4.172e-04$	2.0	$2.668e+00$
160	$6.25e-03$	$1.043e-04$	2.0	$2.670e+00$	$1.043e-04$	2.0	$2.670e+00$
320	$3.13e-03$	$2.608e-05$	2.0	$2.670e+00$	$2.608e-05$	2.0	$2.670e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **`tau`**			Error for $\boldsymbol{u}$ at Mesh **`tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.651e-02$			$1.831e-02$		
20	$5.00e-02$	$4.127e-03$	2.0	$1.651e+00$	$4.598e-03$	2.0	$1.804e+00$
40	$2.50e-02$	$1.032e-03$	2.0	$1.650e+00$	$1.151e-03$	2.0	$1.827e+00$
80	$1.25e-02$	$2.580e-04$	2.0	$1.650e+00$	$2.880e-04$	2.0	$1.836e+00$
160	$6.25e-03$	$6.450e-05$	2.0	$1.651e+00$	$7.201e-05$	2.0	$1.840e+00$
320	$3.13e-03$	$1.613e-05$	2.0	$1.651e+00$	$1.800e-05$	2.0	$1.842e+00$

Table 12: Numerical experiment `ewa021` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.808e-03$			$5.808e-03$		
20	$5.00e-02$	$1.452e-03$	2.0	$5.806e-01$	$1.452e-03$	2.0	$5.806e-01$
40	$2.50e-02$	$3.630e-04$	2.0	$5.808e-01$	$3.630e-04$	2.0	$5.808e-01$
80	$1.25e-02$	$9.076e-05$	2.0	$5.808e-01$	$9.076e-05$	2.0	$5.808e-01$
160	$6.25e-03$	$2.269e-05$	2.0	$5.808e-01$	$2.269e-05$	2.0	$5.808e-01$
320	$3.13e-03$	$5.672e-06$	2.0	$5.809e-01$	$5.672e-06$	2.0	$5.809e-01$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.808e-03$			$5.818e-03$		
20	$5.00e-02$	$1.453e-03$	2.0	$5.798e-01$	$1.454e-03$	2.0	$5.827e-01$
40	$2.50e-02$	$3.633e-04$	2.0	$5.800e-01$	$3.634e-04$	2.0	$5.819e-01$
80	$1.25e-02$	$9.083e-05$	2.0	$5.813e-01$	$9.084e-05$	2.0	$5.818e-01$
160	$6.25e-03$	$2.271e-05$	2.0	$5.813e-01$	$2.271e-05$	2.0	$5.817e-01$
320	$3.13e-03$	$5.677e-06$	2.0	$5.813e-01$	$5.677e-06$	2.0	$5.815e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.474e-03$			$4.474e-03$		
20	$5.00e-02$	$1.119e-03$	2.0	$4.468e-01$	$1.119e-03$	2.0	$4.468e-01$
40	$2.50e-02$	$2.797e-04$	2.0	$4.474e-01$	$2.797e-04$	2.0	$4.474e-01$
80	$1.25e-02$	$6.994e-05$	2.0	$4.475e-01$	$6.994e-05$	2.0	$4.475e-01$
160	$6.25e-03$	$1.748e-05$	2.0	$4.476e-01$	$1.748e-05$	2.0	$4.476e-01$
320	$3.13e-03$	$4.371e-06$	2.0	$4.476e-01$	$4.371e-06$	2.0	$4.476e-01$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.474e-03$			$4.480e-03$		
20	$5.00e-02$	$1.119e-03$	2.0	$4.468e-01$	$1.120e-03$	2.0	$4.484e-01$
40	$2.50e-02$	$2.797e-04$	2.0	$4.474e-01$	$2.799e-04$	2.0	$4.486e-01$
80	$1.25e-02$	$6.994e-05$	2.0	$4.475e-01$	$6.996e-05$	2.0	$4.483e-01$
160	$6.25e-03$	$1.748e-05$	2.0	$4.476e-01$	$1.749e-05$	2.0	$4.481e-01$
320	$3.13e-03$	$4.371e-06$	2.0	$4.476e-01$	$4.371e-06$	2.0	$4.479e-01$

Table 13: Numerical experiment `ewa021` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.395e-05$			$1.395e-05$		
20	$5.00e-02$	$8.749e-07$	4.0	$1.379e-01$	$8.749e-07$	4.0	$1.379e-01$
40	$2.50e-02$	$5.473e-08$	4.0	$1.395e-01$	$5.473e-08$	4.0	$1.395e-01$
80	$1.25e-02$	$3.422e-09$	4.0	$1.397e-01$	$3.422e-09$	4.0	$1.397e-01$
160	$6.25e-03$	$2.346e-10$	3.9	$7.813e-02$	$2.346e-10$	3.9	$7.813e-02$
320	$3.13e-03$	$2.967e-11$	3.0	$8.819e-04$	$2.967e-11$	3.0	$8.819e-04$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.101e-06$			$7.316e-06$		
20	$5.00e-02$	$4.444e-07$	4.0	$7.067e-02$	$4.583e-07$	4.0	$7.260e-02$
40	$2.50e-02$	$2.779e-08$	4.0	$7.101e-02$	$2.866e-08$	4.0	$7.312e-02$
80	$1.25e-02$	$1.738e-09$	4.0	$7.090e-02$	$1.793e-09$	4.0	$7.308e-02$
160	$6.25e-03$	$1.240e-10$	3.8	$3.077e-02$	$1.275e-10$	3.8	$3.250e-02$
320	$3.13e-03$	$1.434e-11$	3.1	$8.966e-04$	$1.434e-11$	3.2	$1.126e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.442e-06$			$7.442e-06$		
20	$5.00e-02$	$4.666e-07$	4.0	$7.361e-02$	$4.666e-07$	4.0	$7.361e-02$
40	$2.50e-02$	$2.919e-08$	4.0	$7.439e-02$	$2.919e-08$	4.0	$7.439e-02$
80	$1.25e-02$	$1.819e-09$	4.0	$7.582e-02$	$1.819e-09$	4.0	$7.582e-02$
160	$6.25e-03$	$1.159e-10$	4.0	$6.591e-02$	$1.159e-10$	4.0	$6.591e-02$
320	$3.13e-03$	$1.498e-11$	3.0	$3.727e-04$	$1.498e-11$	3.0	$3.727e-04$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.783e-06$			$3.845e-06$		
20	$5.00e-02$	$2.367e-07$	4.0	$3.766e-02$	$2.407e-07$	4.0	$3.823e-02$
40	$2.50e-02$	$1.480e-08$	4.0	$3.782e-02$	$1.505e-08$	4.0	$3.843e-02$
80	$1.25e-02$	$9.211e-10$	4.0	$3.875e-02$	$9.368e-10$	4.0	$3.938e-02$
160	$6.25e-03$	$5.985e-11$	3.9	$2.952e-02$	$6.083e-11$	3.9	$3.015e-02$
320	$3.13e-03$	$9.960e-12$	2.6	$3.017e-05$	$1.002e-11$	2.6	$3.307e-05$

Table 14: Numerical experiment `ewa021` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.244e-06$			$1.244e-06$		
20	$5.00e-02$	$7.776e-08$	4.0	$1.242e-02$	$7.776e-08$	4.0	$1.242e-02$
40	$2.50e-02$	$4.860e-09$	4.0	$1.244e-02$	$4.860e-09$	4.0	$1.244e-02$
80	$1.25e-02$	$3.087e-10$	4.0	$1.143e-02$	$3.087e-10$	4.0	$1.143e-02$
160	$6.25e-03$	$3.610e-11$	3.1	$2.407e-04$	$3.610e-11$	3.1	$2.407e-04$
320	$3.13e-03$	$1.853e-10$	-2.4	$2.274e-16$	$1.856e-10$	-2.4	$2.245e-16$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.244e-06$			$1.244e-06$		
20	$5.00e-02$	$7.776e-08$	4.0	$1.242e-02$	$7.780e-08$	4.0	$1.243e-02$
40	$2.50e-02$	$4.860e-09$	4.0	$1.244e-02$	$4.862e-09$	4.0	$1.245e-02$
80	$1.25e-02$	$3.087e-10$	4.0	$1.142e-02$	$3.087e-10$	4.0	$1.144e-02$
160	$6.25e-03$	$3.611e-11$	3.1	$2.405e-04$	$3.613e-11$	3.1	$2.398e-04$
320	$3.13e-03$	$1.853e-10$	-2.4	$2.278e-16$	$1.853e-10$	-2.4	$2.287e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.672e-07$			$4.672e-07$		
20	$5.00e-02$	$2.921e-08$	4.0	$4.666e-03$	$2.921e-08$	4.0	$4.666e-03$
40	$2.50e-02$	$1.825e-09$	4.0	$4.679e-03$	$1.825e-09$	4.0	$4.679e-03$
80	$1.25e-02$	$1.173e-10$	4.0	$4.028e-03$	$1.173e-10$	4.0	$4.028e-03$
160	$6.25e-03$	$1.318e-11$	3.2	$1.181e-04$	$1.318e-11$	3.2	$1.181e-04$
320	$3.13e-03$	$2.080e-11$	-0.7	$4.651e-13$	$2.093e-11$	-0.7	$4.444e-13$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.672e-07$			$4.674e-07$		
20	$5.00e-02$	$2.921e-08$	4.0	$4.666e-03$	$2.922e-08$	4.0	$4.671e-03$
40	$2.50e-02$	$1.825e-09$	4.0	$4.679e-03$	$1.826e-09$	4.0	$4.682e-03$
80	$1.25e-02$	$1.173e-10$	4.0	$4.028e-03$	$1.173e-10$	4.0	$4.030e-03$
160	$6.25e-03$	$1.268e-11$	3.2	$1.503e-04$	$1.268e-11$	3.2	$1.502e-04$
320	$3.13e-03$	$2.072e-11$	-0.7	$3.494e-13$	$2.072e-11$	-0.7	$3.495e-13$

Table 15: Numerical experiment `ewa021` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.613e-09$			$1.613e-09$		
20	$5.00e-02$	$2.588e-11$	6.0	$1.479e-03$	$2.588e-11$	6.0	$1.479e-03$
40	$2.50e-02$	$4.116e-12$	2.7	$7.303e-08$	$4.116e-12$	2.7	$7.303e-08$
80	$1.25e-02$	$1.072e-11$	-1.4	$2.520e-14$	$1.072e-11$	-1.4	$2.520e-14$
160	$6.25e-03$	$6.615e-11$	-2.6	$1.083e-16$	$6.615e-11$	-2.6	$1.083e-16$
320	$3.13e-03$	$1.948e-10$	-1.6	$2.437e-14$	$1.948e-10$	-1.6	$2.437e-14$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.433e-10$			$7.537e-10$		
20	$5.00e-02$	$1.200e-11$	6.0	$6.673e-04$	$1.217e-11$	6.0	$6.764e-04$
40	$2.50e-02$	$2.586e-12$	2.2	$9.107e-09$	$2.586e-12$	2.2	$9.807e-09$
80	$1.25e-02$	$2.299e-12$	0.2	$4.840e-12$	$2.299e-12$	0.2	$4.840e-12$
160	$6.25e-03$	$3.968e-11$	-4.1	$3.473e-20$	$3.968e-11$	-4.1	$3.473e-20$
320	$3.13e-03$	$1.251e-10$	-1.7	$8.860e-15$	$1.251e-10$	-1.7	$8.860e-15$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa021	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.147e-10$			$4.147e-10$		
20	$5.00e-02$	$6.740e-12$	5.9	$3.639e-04$	$6.740e-12$	5.9	$3.639e-04$
40	$2.50e-02$	$1.217e-12$	2.5	$1.102e-08$	$1.217e-12$	2.5	$1.102e-08$
80	$1.25e-02$	$2.443e-12$	-1.0	$2.977e-14$	$2.443e-12$	-1.0	$2.977e-14$
160	$6.25e-03$	$7.465e-12$	-1.6	$2.093e-15$	$7.465e-12$	-1.6	$2.093e-15$
320	$3.13e-03$	$5.139e-11$	-2.8	$5.477e-18$	$5.139e-11$	-2.8	$5.477e-18$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.909e-10$			$1.920e-10$		
20	$5.00e-02$	$3.239e-12$	5.9	$1.451e-04$	$3.259e-12$	5.9	$1.457e-04$
40	$2.50e-02$	$1.001e-12$	1.7	$5.187e-10$	$1.001e-12$	1.7	$5.364e-10$
80	$1.25e-02$	$1.813e-12$	-0.9	$4.241e-14$	$1.813e-12$	-0.9	$4.241e-14$
160	$6.25e-03$	$5.343e-12$	-1.6	$1.950e-15$	$5.346e-12$	-1.6	$1.944e-15$
320	$3.13e-03$	$3.566e-11$	-2.7	$4.918e-18$	$3.566e-11$	-2.7	$4.937e-18$

Table 16: Numerical experiment `ewa021` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.067e-02$			$1.067e-02$		
20	$5.00e-02$	$2.858e-03$	1.9	$8.498e-01$	$2.858e-03$	1.9	$8.498e-01$
40	$2.50e-02$	$7.392e-04$	2.0	$9.868e-01$	$7.392e-04$	2.0	$9.868e-01$
80	$1.25e-02$	$1.879e-04$	2.0	$1.081e+00$	$1.879e-04$	2.0	$1.081e+00$
160	$6.25e-03$	$4.739e-05$	2.0	$1.140e+00$	$4.739e-05$	2.0	$1.140e+00$
320	$3.13e-03$	$1.190e-05$	2.0	$1.176e+00$	$1.190e-05$	2.0	$1.176e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.387e-05$			$1.873e-03$		
20	$5.00e-02$	$8.715e-06$	2.0	$3.076e-03$	$4.756e-04$	2.0	$1.778e-01$
40	$2.50e-02$	$2.209e-06$	2.0	$3.287e-03$	$1.198e-04$	2.0	$1.844e-01$
80	$1.25e-02$	$5.530e-07$	2.0	$3.503e-03$	$3.004e-05$	2.0	$1.882e-01$
160	$6.25e-03$	$1.384e-07$	2.0	$3.520e-03$	$7.522e-06$	2.0	$1.903e-01$
320	$3.13e-03$	$3.460e-08$	2.0	$3.540e-03$	$1.882e-06$	2.0	$1.914e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.600e-02$			$5.600e-02$		
20	$5.00e-02$	$2.790e-02$	1.0	$5.666e-01$	$2.790e-02$	1.0	$5.666e-01$
40	$2.50e-02$	$1.393e-02$	1.0	$5.623e-01$	$1.393e-02$	1.0	$5.623e-01$
80	$1.25e-02$	$6.957e-03$	1.0	$5.597e-01$	$6.957e-03$	1.0	$5.597e-01$
160	$6.25e-03$	$3.477e-03$	1.0	$5.581e-01$	$3.477e-03$	1.0	$5.581e-01$
320	$3.13e-03$	$1.738e-03$	1.0	$5.572e-01$	$1.738e-03$	1.0	$5.572e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.600e-02$			$5.600e-02$		
20	$5.00e-02$	$2.790e-02$	1.0	$5.666e-01$	$2.790e-02$	1.0	$5.666e-01$
40	$2.50e-02$	$1.393e-02$	1.0	$5.623e-01$	$1.393e-02$	1.0	$5.623e-01$
80	$1.25e-02$	$6.957e-03$	1.0	$5.597e-01$	$6.957e-03$	1.0	$5.597e-01$
160	$6.25e-03$	$3.477e-03$	1.0	$5.581e-01$	$3.477e-03$	1.0	$5.581e-01$
320	$3.13e-03$	$1.738e-03$	1.0	$5.572e-01$	$1.738e-03$	1.0	$5.572e-01$

Table 17: Numerical experiment `maerz021` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.610e-03$			$2.610e-03$		
20	$5.00e-02$	$6.528e-04$	2.0	$2.605e-01$	$6.528e-04$	2.0	$2.605e-01$
40	$2.50e-02$	$1.632e-04$	2.0	$2.610e-01$	$1.632e-04$	2.0	$2.610e-01$
80	$1.25e-02$	$4.081e-05$	2.0	$2.611e-01$	$4.081e-05$	2.0	$2.611e-01$
160	$6.25e-03$	$1.020e-05$	2.0	$2.611e-01$	$1.020e-05$	2.0	$2.611e-01$
320	$3.13e-03$	$2.550e-06$	2.0	$2.611e-01$	$2.550e-06$	2.0	$2.611e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.396e-04$			$1.396e-04$		
20	$5.00e-02$	$3.491e-05$	2.0	$1.396e-02$	$3.491e-05$	2.0	$1.396e-02$
40	$2.50e-02$	$8.728e-06$	2.0	$1.396e-02$	$8.728e-06$	2.0	$1.396e-02$
80	$1.25e-02$	$2.182e-06$	2.0	$1.396e-02$	$2.182e-06$	2.0	$1.396e-02$
160	$6.25e-03$	$5.455e-07$	2.0	$1.396e-02$	$5.455e-07$	2.0	$1.396e-02$
320	$3.13e-03$	$1.364e-07$	2.0	$1.396e-02$	$1.364e-07$	2.0	$1.396e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.958e-03$			$1.958e-03$		
20	$5.00e-02$	$4.896e-04$	2.0	$1.955e-01$	$4.896e-04$	2.0	$1.955e-01$
40	$2.50e-02$	$1.224e-04$	2.0	$1.958e-01$	$1.224e-04$	2.0	$1.958e-01$
80	$1.25e-02$	$3.060e-05$	2.0	$1.958e-01$	$3.060e-05$	2.0	$1.958e-01$
160	$6.25e-03$	$7.651e-06$	2.0	$1.959e-01$	$7.651e-06$	2.0	$1.959e-01$
320	$3.13e-03$	$1.913e-06$	2.0	$1.959e-01$	$1.913e-06$	2.0	$1.959e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.744e-08$			$8.977e-06$		
20	$5.00e-02$	$3.658e-09$	4.0	$5.400e-04$	$1.150e-06$	3.0	$8.270e-03$
40	$2.50e-02$	$2.295e-10$	4.0	$5.753e-04$	$1.455e-07$	3.0	$8.736e-03$
80	$1.25e-02$	$1.437e-11$	4.0	$5.818e-04$	$1.830e-08$	3.0	$9.024e-03$
160	$6.25e-03$	$9.184e-13$	4.0	$5.113e-04$	$2.294e-09$	3.0	$9.196e-03$
320	$3.13e-03$	$1.383e-13$	2.7	$9.601e-07$	$2.872e-10$	3.0	$9.296e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.538e-06$			$2.410e-05$		
20	$5.00e-02$	$4.465e-07$	3.0	$3.429e-03$	$3.312e-06$	2.9	$1.758e-02$
40	$2.50e-02$	$5.605e-08$	3.0	$3.508e-03$	$4.335e-07$	2.9	$2.173e-02$
80	$1.25e-02$	$7.019e-09$	3.0	$3.550e-03$	$5.543e-08$	3.0	$2.461e-02$
160	$6.25e-03$	$8.782e-10$	3.0	$3.572e-03$	$7.006e-09$	3.0	$2.644e-02$
320	$3.13e-03$	$1.099e-10$	3.0	$3.575e-03$	$8.807e-10$	3.0	$2.755e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.538e-06$			$2.766e-05$		
20	$5.00e-02$	$4.465e-07$	3.0	$3.429e-03$	$3.545e-06$	3.0	$2.547e-02$
40	$2.50e-02$	$5.605e-08$	3.0	$3.508e-03$	$4.483e-07$	3.0	$2.695e-02$
80	$1.25e-02$	$7.019e-09$	3.0	$3.550e-03$	$5.636e-08$	3.0	$2.784e-02$
160	$6.25e-03$	$8.782e-10$	3.0	$3.572e-03$	$7.065e-09$	3.0	$2.835e-02$
320	$3.13e-03$	$1.099e-10$	3.0	$3.575e-03$	$8.843e-10$	3.0	$2.865e-02$

Table 18: Numerical experiment `maerz021` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.129e-06$			$7.129e-06$		
20	$5.00e-02$	$4.659e-07$	3.9	$6.145e-02$	$4.659e-07$	3.9	$6.145e-02$
40	$2.50e-02$	$2.978e-08$	4.0	$6.767e-02$	$2.978e-08$	4.0	$6.767e-02$
80	$1.25e-02$	$1.880e-09$	4.0	$7.222e-02$	$1.880e-09$	4.0	$7.222e-02$
160	$6.25e-03$	$1.148e-10$	4.0	$8.922e-02$	$1.148e-10$	4.0	$8.922e-02$
320	$3.13e-03$	$1.645e-11$	2.8	$1.735e-04$	$1.645e-11$	2.8	$1.735e-04$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.101e-09$			$2.193e-07$		
20	$5.00e-02$	$5.055e-10$	4.0	$8.142e-05$	$1.392e-08$	4.0	$2.084e-03$
40	$2.50e-02$	$3.158e-11$	4.0	$8.105e-05$	$8.764e-10$	4.0	$2.155e-03$
80	$1.25e-02$	$1.970e-12$	4.0	$8.177e-05$	$5.498e-11$	4.0	$2.199e-03$
160	$6.25e-03$	$1.199e-13$	4.0	$9.525e-05$	$3.447e-12$	4.0	$2.205e-03$
320	$3.13e-03$	$9.037e-14$	0.4	$9.505e-13$	$2.349e-13$	3.9	$1.200e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.802e-06$			$3.802e-06$		
20	$5.00e-02$	$2.485e-07$	3.9	$3.278e-02$	$2.485e-07$	3.9	$3.278e-02$
40	$2.50e-02$	$1.588e-08$	4.0	$3.609e-02$	$1.588e-08$	4.0	$3.609e-02$
80	$1.25e-02$	$1.004e-09$	4.0	$3.832e-02$	$1.004e-09$	4.0	$3.832e-02$
160	$6.25e-03$	$6.094e-11$	4.0	$4.944e-02$	$6.094e-11$	4.0	$4.944e-02$
320	$3.13e-03$	$1.425e-11$	2.1	$2.542e-06$	$1.425e-11$	2.1	$2.542e-06$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.577e-11$			$7.728e-08$		
20	$5.00e-02$	$8.480e-13$	6.0	$6.103e-05$	$4.927e-09$	4.0	$7.235e-04$
40	$2.50e-02$	$9.526e-14$	3.2	$1.077e-08$	$3.109e-10$	4.0	$7.557e-04$
80	$1.25e-02$	$1.973e-13$	-1.1	$1.977e-15$	$1.953e-11$	4.0	$7.752e-04$
160	$6.25e-03$	$3.690e-13$	-0.9	$3.764e-15$	$1.225e-12$	4.0	$7.823e-04$
320	$3.13e-03$	$8.087e-13$	-1.1	$1.181e-15$	$8.540e-13$	0.5	$1.720e-11$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.265e-10$			$1.404e-07$		
20	$5.00e-02$	$1.392e-11$	4.9	$3.691e-05$	$9.794e-09$	3.8	$9.745e-04$
40	$2.50e-02$	$4.523e-13$	4.9	$3.764e-05$	$6.459e-10$	3.9	$1.242e-03$
80	$1.25e-02$	$1.050e-13$	2.1	$1.075e-09$	$4.146e-11$	4.0	$1.436e-03$
160	$6.25e-03$	$1.984e-13$	-0.9	$1.876e-15$	$2.698e-12$	3.9	$1.316e-03$
320	$3.13e-03$	$4.731e-13$	-1.3	$3.422e-16$	$5.287e-13$	2.4	$4.105e-07$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.059e-10$			$1.675e-07$		
20	$5.00e-02$	$2.308e-11$	4.9	$6.072e-05$	$1.068e-08$	4.0	$1.569e-03$
40	$2.50e-02$	$7.256e-13$	5.0	$7.197e-05$	$6.741e-10$	4.0	$1.636e-03$
80	$1.25e-02$	$5.840e-14$	3.6	$4.838e-07$	$4.235e-11$	4.0	$1.679e-03$
160	$6.25e-03$	$1.310e-13$	-1.2	$3.532e-16$	$2.655e-12$	4.0	$1.701e-03$
320	$3.13e-03$	$2.727e-13$	-1.1	$6.115e-16$	$3.801e-13$	2.8	$4.024e-06$

Table 19: Numerical experiment `maerz021` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.495e-07$			$5.495e-07$		
20	$5.00e-02$	$3.436e-08$	4.0	$5.487e-03$	$3.436e-08$	4.0	$5.487e-03$
40	$2.50e-02$	$2.149e-09$	4.0	$5.482e-03$	$2.149e-09$	4.0	$5.482e-03$
80	$1.25e-02$	$1.334e-10$	4.0	$5.705e-03$	$1.334e-10$	4.0	$5.705e-03$
160	$6.25e-03$	$9.598e-12$	3.8	$2.243e-03$	$9.598e-12$	3.8	$2.243e-03$
320	$3.13e-03$	$3.340e-11$	-1.8	$1.040e-15$	$3.340e-11$	-1.8	$1.040e-15$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.061e-08$			$1.061e-08$		
20	$5.00e-02$	$6.633e-10$	4.0	$1.061e-04$	$6.633e-10$	4.0	$1.061e-04$
40	$2.50e-02$	$4.148e-11$	4.0	$1.059e-04$	$4.148e-11$	4.0	$1.059e-04$
80	$1.25e-02$	$2.644e-12$	4.0	$9.552e-05$	$2.645e-12$	4.0	$9.544e-05$
160	$6.25e-03$	$3.630e-13$	2.9	$7.483e-07$	$3.630e-13$	2.9	$7.492e-07$
320	$3.13e-03$	$5.391e-13$	-0.6	$2.007e-14$	$5.391e-13$	-0.6	$2.007e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.044e-07$			$2.044e-07$		
20	$5.00e-02$	$1.278e-08$	4.0	$2.042e-03$	$1.278e-08$	4.0	$2.042e-03$
40	$2.50e-02$	$7.990e-10$	4.0	$2.045e-03$	$7.990e-10$	4.0	$2.045e-03$
80	$1.25e-02$	$4.962e-11$	4.0	$2.116e-03$	$4.962e-11$	4.0	$2.116e-03$
160	$6.25e-03$	$1.210e-11$	2.0	$3.721e-07$	$1.210e-11$	2.0	$3.721e-07$
320	$3.13e-03$	$5.241e-12$	1.2	$5.526e-09$	$5.241e-12$	1.2	$5.526e-09$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.326e-15$			$2.705e-10$		
20	$5.00e-02$	$1.776e-15$	2.4	$2.301e-12$	$8.726e-12$	5.0	$2.435e-05$
40	$2.50e-02$	$6.217e-15$	-1.8	$7.909e-18$	$2.769e-13$	5.0	$2.614e-05$
80	$1.25e-02$	$2.109e-14$	-1.8	$9.332e-18$	$2.198e-14$	3.7	$1.985e-07$
160	$6.25e-03$	$3.708e-14$	-0.8	$5.961e-16$	$3.708e-14$	-0.8	$8.063e-16$
320	$3.13e-03$	$2.687e-14$	0.5	$3.924e-13$	$2.687e-14$	0.5	$3.924e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.749e-13$			$4.708e-10$		
20	$5.00e-02$	$1.490e-13$	0.2	$2.976e-13$	$1.616e-11$	4.9	$3.447e-05$
40	$2.50e-02$	$3.014e-13$	-1.0	$7.089e-15$	$5.338e-13$	4.9	$4.067e-05$
80	$1.25e-02$	$6.430e-13$	-1.1	$5.345e-15$	$6.430e-13$	-0.3	$1.982e-13$
160	$6.25e-03$	$1.306e-12$	-1.0	$7.303e-15$	$1.306e-12$	-1.0	$7.303e-15$
320	$3.13e-03$	$2.674e-12$	-1.0	$6.857e-15$	$2.674e-12$	-1.0	$6.857e-15$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.081e-13$			$5.317e-10$		
20	$5.00e-02$	$1.490e-13$	0.5	$6.308e-13$	$1.715e-11$	5.0	$4.783e-05$
40	$2.50e-02$	$2.986e-13$	-1.0	$7.378e-15$	$5.520e-13$	5.0	$4.835e-05$
80	$1.25e-02$	$5.889e-13$	-1.0	$8.054e-15$	$5.889e-13$	-0.1	$3.913e-13$
160	$6.25e-03$	$1.181e-12$	-1.0	$7.222e-15$	$1.182e-12$	-1.0	$7.205e-15$
320	$3.13e-03$	$2.389e-12$	-1.0	$6.806e-15$	$2.390e-12$	-1.0	$6.813e-15$

Table 20: Numerical experiment `maerz021` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.980e-10$			$8.980e-10$		
20	$5.00e-02$	$1.322e-11$	6.1	$1.095e-03$	$1.322e-11$	6.1	$1.095e-03$
40	$2.50e-02$	$4.846e-12$	1.4	$1.010e-09$	$4.846e-12$	1.4	$1.010e-09$
80	$1.25e-02$	$9.617e-12$	-1.0	$1.263e-13$	$9.617e-12$	-1.0	$1.263e-13$
160	$6.25e-03$	$3.810e-11$	-2.0	$1.596e-15$	$3.810e-11$	-2.0	$1.596e-15$
320	$3.13e-03$	$6.125e-11$	-0.7	$1.180e-12$	$6.125e-11$	-0.7	$1.180e-12$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.062e-13$			$1.056e-11$		
20	$5.00e-02$	$4.174e-14$	3.9	$4.392e-09$	$1.723e-13$	5.9	$9.131e-06$
40	$2.50e-02$	$5.418e-14$	-0.4	$1.353e-14$	$5.418e-14$	1.7	$2.558e-11$
80	$1.25e-02$	$5.440e-14$	-0.0	$5.301e-14$	$5.440e-14$	-0.0	$5.301e-14$
160	$6.25e-03$	$9.437e-14$	-0.8	$1.672e-15$	$9.437e-14$	-0.8	$1.672e-15$
320	$3.13e-03$	$1.215e-13$	-0.4	$1.487e-14$	$1.215e-13$	-0.4	$1.487e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.312e-10$			$2.312e-10$		
20	$5.00e-02$	$3.652e-12$	6.0	$2.228e-04$	$3.652e-12$	6.0	$2.228e-04$
40	$2.50e-02$	$7.001e-13$	2.4	$4.605e-09$	$7.001e-13$	2.4	$4.605e-09$
80	$1.25e-02$	$3.661e-12$	-2.4	$1.051e-16$	$3.661e-12$	-2.4	$1.051e-16$
160	$6.25e-03$	$3.232e-12$	0.2	$8.055e-12$	$3.232e-12$	0.2	$8.055e-12$
320	$3.13e-03$	$1.839e-11$	-2.5	$9.565e-18$	$1.839e-11$	-2.5	$9.565e-18$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.132e-14$			$1.534e-12$		
20	$5.00e-02$	$2.176e-14$	-0.9	$1.293e-15$	$3.753e-14$	5.4	$3.459e-07$
40	$2.50e-02$	$2.953e-14$	-0.4	$5.814e-15$	$3.042e-14$	0.3	$9.297e-14$
80	$1.25e-02$	$7.450e-14$	-1.3	$2.146e-16$	$7.505e-14$	-1.3	$2.488e-16$
160	$6.25e-03$	$1.878e-13$	-1.3	$2.152e-16$	$1.878e-13$	-1.3	$2.272e-16$
320	$3.13e-03$	$4.086e-13$	-1.1	$6.354e-16$	$4.086e-13$	-1.1	$6.354e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz021	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.461e-13$			$2.456e-12$		
20	$5.00e-02$	$1.317e-12$	-1.0	$6.068e-14$	$1.421e-12$	0.8	$1.513e-11$
40	$2.50e-02$	$2.658e-12$	-1.0	$6.332e-14$	$2.686e-12$	-0.9	$9.048e-14$
80	$1.25e-02$	$5.323e-12$	-1.0	$6.599e-14$	$5.360e-12$	-1.0	$6.798e-14$
160	$6.25e-03$	$1.079e-11$	-1.0	$6.111e-14$	$1.092e-11$	-1.0	$5.965e-14$
320	$3.13e-03$	$2.151e-11$	-1.0	$6.906e-14$	$2.164e-11$	-1.0	$7.302e-14$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.461e-13$			$2.852e-12$		
20	$5.00e-02$	$1.317e-12$	-1.0	$6.068e-14$	$1.387e-12$	1.0	$3.127e-11$
40	$2.50e-02$	$2.658e-12$	-1.0	$6.332e-14$	$2.729e-12$	-1.0	$7.456e-14$
80	$1.25e-02$	$5.323e-12$	-1.0	$6.599e-14$	$5.393e-12$	-1.0	$7.267e-14$
160	$6.25e-03$	$1.069e-11$	-1.0	$6.491e-14$	$1.076e-11$	-1.0	$6.856e-14$
320	$3.13e-03$	$2.140e-11$	-1.0	$6.609e-14$	$2.148e-11$	-1.0	$6.812e-14$

Table 21: Numerical experiment `maerz021` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.467e-01$			$2.467e-01$		
20	$5.00e-02$	$7.296e-02$	1.8	$1.413e+01$	$7.296e-02$	1.8	$1.413e+01$
40	$2.50e-02$	$1.988e-02$	1.9	$2.012e+01$	$1.988e-02$	1.9	$2.012e+01$
80	$1.25e-02$	$5.191e-03$	1.9	$2.522e+01$	$5.191e-03$	1.9	$2.522e+01$
160	$6.25e-03$	$1.327e-03$	2.0	$2.891e+01$	$1.327e-03$	2.0	$2.891e+01$
320	$3.13e-03$	$3.353e-04$	2.0	$3.133e+01$	$3.353e-04$	2.0	$3.133e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.557e-01$			$1.557e-01$		
20	$5.00e-02$	$4.060e-02$	1.9	$1.354e+01$	$4.060e-02$	1.9	$1.354e+01$
40	$2.50e-02$	$1.026e-02$	2.0	$1.548e+01$	$1.026e-02$	2.0	$1.548e+01$
80	$1.25e-02$	$2.597e-03$	2.0	$1.538e+01$	$2.597e-03$	2.0	$1.538e+01$
160	$6.25e-03$	$6.541e-04$	2.0	$1.588e+01$	$6.541e-04$	2.0	$1.588e+01$
320	$3.13e-03$	$1.641e-04$	2.0	$1.633e+01$	$1.641e-04$	2.0	$1.633e+01$

Table 22: Numerical experiment `ewa0311` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.216e-02$			$5.216e-02$		
20	$5.00e-02$	$1.318e-02$	2.0	$5.040e+00$	$1.318e-02$	2.0	$5.040e+00$
40	$2.50e-02$	$3.304e-03$	2.0	$5.207e+00$	$3.304e-03$	2.0	$5.207e+00$
80	$1.25e-02$	$8.264e-04$	2.0	$5.267e+00$	$8.264e-04$	2.0	$5.267e+00$
160	$6.25e-03$	$2.066e-04$	2.0	$5.284e+00$	$2.066e-04$	2.0	$5.284e+00$
320	$3.13e-03$	$5.166e-05$	2.0	$5.288e+00$	$5.166e-05$	2.0	$5.288e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.669e-02$			$4.669e-02$		
20	$5.00e-02$	$1.181e-02$	2.0	$4.487e+00$	$1.181e-02$	2.0	$4.487e+00$
40	$2.50e-02$	$2.962e-03$	2.0	$4.664e+00$	$2.962e-03$	2.0	$4.664e+00$
80	$1.25e-02$	$7.412e-04$	2.0	$4.721e+00$	$7.412e-04$	2.0	$4.721e+00$
160	$6.25e-03$	$1.853e-04$	2.0	$4.738e+00$	$1.853e-04$	2.0	$4.738e+00$
320	$3.13e-03$	$4.633e-05$	2.0	$4.743e+00$	$4.633e-05$	2.0	$4.743e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.918e-02$			$3.918e-02$		
20	$5.00e-02$	$9.886e-03$	2.0	$3.798e+00$	$9.886e-03$	2.0	$3.798e+00$
40	$2.50e-02$	$2.478e-03$	2.0	$3.911e+00$	$2.478e-03$	2.0	$3.911e+00$
80	$1.25e-02$	$6.198e-04$	2.0	$3.952e+00$	$6.198e-04$	2.0	$3.952e+00$
160	$6.25e-03$	$1.550e-04$	2.0	$3.963e+00$	$1.550e-04$	2.0	$3.963e+00$
320	$3.13e-03$	$3.875e-05$	2.0	$3.966e+00$	$3.875e-05$	2.0	$3.966e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.694e-02$			$3.694e-02$		
20	$5.00e-02$	$9.332e-03$	2.0	$3.568e+00$	$9.332e-03$	2.0	$3.568e+00$
40	$2.50e-02$	$2.339e-03$	2.0	$3.690e+00$	$2.339e-03$	2.0	$3.690e+00$
80	$1.25e-02$	$5.852e-04$	2.0	$3.730e+00$	$5.852e-04$	2.0	$3.730e+00$
160	$6.25e-03$	$1.463e-04$	2.0	$3.741e+00$	$1.463e-04$	2.0	$3.741e+00$
320	$3.13e-03$	$3.658e-05$	2.0	$3.745e+00$	$3.658e-05$	2.0	$3.745e+00$

Table 23: Numerical experiment `ewa0311` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.968e-03$			$1.968e-03$		
20	$5.00e-02$	$1.499e-04$	3.7	$1.021e+01$	$1.499e-04$	3.7	$1.021e+01$
40	$2.50e-02$	$1.039e-05$	3.9	$1.534e+01$	$1.039e-05$	3.9	$1.534e+01$
80	$1.25e-02$	$6.846e-07$	3.9	$2.007e+01$	$6.846e-07$	3.9	$2.007e+01$
160	$6.25e-03$	$4.395e-08$	4.0	$2.367e+01$	$4.395e-08$	4.0	$2.367e+01$
320	$3.13e-03$	$2.784e-09$	4.0	$2.610e+01$	$2.784e-09$	4.0	$2.610e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.351e-03$			$1.351e-03$		
20	$5.00e-02$	$9.022e-05$	3.9	$1.085e+01$	$9.022e-05$	3.9	$1.085e+01$
40	$2.50e-02$	$5.739e-06$	4.0	$1.337e+01$	$5.739e-06$	4.0	$1.337e+01$
80	$1.25e-02$	$3.602e-07$	4.0	$1.436e+01$	$3.602e-07$	4.0	$1.436e+01$
160	$6.25e-03$	$2.254e-08$	4.0	$1.467e+01$	$2.254e-08$	4.0	$1.467e+01$
320	$3.13e-03$	$1.409e-09$	4.0	$1.474e+01$	$1.409e-09$	4.0	$1.474e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.054e-03$			$1.054e-03$		
20	$5.00e-02$	$8.013e-05$	3.7	$5.499e+00$	$8.013e-05$	3.7	$5.499e+00$
40	$2.50e-02$	$5.551e-06$	3.9	$8.221e+00$	$5.551e-06$	3.9	$8.221e+00$
80	$1.25e-02$	$3.657e-07$	3.9	$1.073e+01$	$3.657e-07$	3.9	$1.073e+01$
160	$6.25e-03$	$2.348e-08$	4.0	$1.265e+01$	$2.348e-08$	4.0	$1.265e+01$
320	$3.13e-03$	$1.487e-09$	4.0	$1.394e+01$	$1.487e-09$	4.0	$1.394e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.249e-04$			$7.249e-04$		
20	$5.00e-02$	$4.830e-05$	3.9	$5.859e+00$	$4.830e-05$	3.9	$5.859e+00$
40	$2.50e-02$	$3.071e-06$	4.0	$7.176e+00$	$3.071e-06$	4.0	$7.176e+00$
80	$1.25e-02$	$1.927e-07$	4.0	$7.690e+00$	$1.927e-07$	4.0	$7.690e+00$
160	$6.25e-03$	$1.206e-08$	4.0	$7.849e+00$	$1.206e-08$	4.0	$7.849e+00$
320	$3.13e-03$	$7.535e-10$	4.0	$7.908e+00$	$7.535e-10$	4.0	$7.908e+00$

Table 24: Numerical experiment `ewa0311` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.371e-04$			$2.371e-04$		
20	$5.00e-02$	$1.531e-05$	4.0	$2.127e+00$	$1.531e-05$	4.0	$2.127e+00$
40	$2.50e-02$	$9.727e-07$	4.0	$2.283e+00$	$9.727e-07$	4.0	$2.283e+00$
80	$1.25e-02$	$6.153e-08$	4.0	$2.336e+00$	$6.153e-08$	4.0	$2.336e+00$
160	$6.25e-03$	$3.887e-09$	4.0	$2.354e+00$	$3.887e-09$	4.0	$2.354e+00$
320	$3.13e-03$	$2.446e-10$	4.0	$2.422e+00$	$2.446e-10$	4.0	$2.422e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.330e-04$			$2.330e-04$		
20	$5.00e-02$	$1.487e-05$	4.0	$2.173e+00$	$1.487e-05$	4.0	$2.173e+00$
40	$2.50e-02$	$9.344e-07$	4.0	$2.327e+00$	$9.344e-07$	4.0	$2.327e+00$
80	$1.25e-02$	$5.847e-08$	4.0	$2.377e+00$	$5.847e-08$	4.0	$2.377e+00$
160	$6.25e-03$	$3.655e-09$	4.0	$2.392e+00$	$3.655e-09$	4.0	$2.392e+00$
320	$3.13e-03$	$2.277e-10$	4.0	$2.451e+00$	$2.277e-10$	4.0	$2.451e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.852e-05$			$8.852e-05$		
20	$5.00e-02$	$5.706e-06$	4.0	$7.989e-01$	$5.706e-06$	4.0	$7.989e-01$
40	$2.50e-02$	$3.623e-07$	4.0	$8.527e-01$	$3.623e-07$	4.0	$8.527e-01$
80	$1.25e-02$	$2.292e-08$	4.0	$8.708e-01$	$2.292e-08$	4.0	$8.708e-01$
160	$6.25e-03$	$1.448e-09$	4.0	$8.766e-01$	$1.448e-09$	4.0	$8.766e-01$
320	$3.13e-03$	$9.168e-11$	4.0	$8.626e-01$	$9.168e-11$	4.0	$8.626e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.813e-05$			$8.813e-05$		
20	$5.00e-02$	$5.613e-06$	4.0	$8.277e-01$	$5.613e-06$	4.0	$8.277e-01$
40	$2.50e-02$	$3.524e-07$	4.0	$8.804e-01$	$3.524e-07$	4.0	$8.804e-01$
80	$1.25e-02$	$2.205e-08$	4.0	$8.973e-01$	$2.205e-08$	4.0	$8.973e-01$
160	$6.25e-03$	$1.378e-09$	4.0	$9.020e-01$	$1.378e-09$	4.0	$9.020e-01$
320	$3.13e-03$	$8.632e-11$	4.0	$8.900e-01$	$8.632e-11$	4.0	$8.900e-01$

Table 25: Numerical experiment `ewa0311` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.277e-06$			$8.277e-06$		
20	$5.00e-02$	$1.841e-07$	5.5	$2.561e+00$	$1.841e-07$	5.5	$2.561e+00$
40	$2.50e-02$	$6.412e-09$	4.8	$3.688e-01$	$6.412e-09$	4.8	$3.688e-01$
80	$1.25e-02$	$3.171e-10$	4.3	$5.704e-02$	$3.171e-10$	4.3	$5.704e-02$
160	$6.25e-03$	$1.856e-11$	4.1	$1.968e-02$	$1.856e-11$	4.1	$1.968e-02$
320	$3.13e-03$	$1.891e-12$	3.3	$3.398e-04$	$1.891e-12$	3.3	$3.398e-04$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.975e-06$			$5.975e-06$		
20	$5.00e-02$	$1.063e-07$	5.8	$3.885e+00$	$1.063e-07$	5.8	$3.885e+00$
40	$2.50e-02$	$1.799e-09$	5.9	$4.806e+00$	$1.799e-09$	5.9	$4.806e+00$
80	$1.25e-02$	$2.968e-11$	5.9	$5.525e+00$	$2.968e-11$	5.9	$5.525e+00$
160	$6.25e-03$	$5.006e-13$	5.9	$4.800e+00$	$5.006e-13$	5.9	$4.800e+00$
320	$3.13e-03$	$3.897e-13$	0.4	$3.131e-12$	$3.897e-13$	0.4	$3.131e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0311	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.134e-06$			$2.134e-06$		
20	$5.00e-02$	$4.943e-08$	5.4	$5.772e-01$	$4.943e-08$	5.4	$5.772e-01$
40	$2.50e-02$	$1.778e-09$	4.8	$8.620e-02$	$1.778e-09$	4.8	$8.620e-02$
80	$1.25e-02$	$8.965e-11$	4.3	$1.426e-02$	$8.965e-11$	4.3	$1.426e-02$
160	$6.25e-03$	$5.241e-12$	4.1	$5.602e-03$	$5.241e-12$	4.1	$5.602e-03$
320	$3.13e-03$	$3.497e-13$	3.9	$2.127e-03$	$3.497e-13$	3.9	$2.127e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.539e-06$			$1.539e-06$		
20	$5.00e-02$	$2.731e-08$	5.8	$1.008e+00$	$2.731e-08$	5.8	$1.008e+00$
40	$2.50e-02$	$4.614e-10$	5.9	$1.247e+00$	$4.614e-10$	5.9	$1.247e+00$
80	$1.25e-02$	$7.619e-12$	5.9	$1.408e+00$	$7.619e-12$	5.9	$1.408e+00$
160	$6.25e-03$	$1.179e-13$	6.0	$2.128e+00$	$1.179e-13$	6.0	$2.128e+00$
320	$3.13e-03$	$6.750e-14$	0.8	$6.971e-12$	$6.750e-14$	0.8	$6.971e-12$

Table 26: Numerical experiment `ewa0311` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.658e-01$			$1.658e-01$		
20	$5.00e-02$	$4.310e-02$	1.9	$1.455e+01$	$4.310e-02$	1.9	$1.455e+01$
40	$2.50e-02$	$1.089e-02$	2.0	$1.648e+01$	$1.089e-02$	2.0	$1.648e+01$
80	$1.25e-02$	$2.729e-03$	2.0	$1.717e+01$	$2.729e-03$	2.0	$1.717e+01$
160	$6.25e-03$	$6.828e-04$	2.0	$1.739e+01$	$6.828e-04$	2.0	$1.739e+01$
320	$3.13e-03$	$1.707e-04$	2.0	$1.746e+01$	$1.707e-04$	2.0	$1.746e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.582e-01$			$1.582e-01$		
20	$5.00e-02$	$4.126e-02$	1.9	$1.372e+01$	$4.126e-02$	1.9	$1.372e+01$
40	$2.50e-02$	$1.043e-02$	2.0	$1.575e+01$	$1.043e-02$	2.0	$1.575e+01$
80	$1.25e-02$	$2.614e-03$	2.0	$1.644e+01$	$2.614e-03$	2.0	$1.644e+01$
160	$6.25e-03$	$6.541e-04$	2.0	$1.666e+01$	$6.541e-04$	2.0	$1.666e+01$
320	$3.13e-03$	$1.635e-04$	2.0	$1.672e+01$	$1.635e-04$	2.0	$1.672e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.778e-02$			$6.778e-02$		
20	$5.00e-02$	$3.200e-02$	1.1	$8.198e-01$	$3.200e-02$	1.1	$8.198e-01$
40	$2.50e-02$	$1.555e-02$	1.0	$7.244e-01$	$1.555e-02$	1.0	$7.244e-01$
80	$1.25e-02$	$7.659e-03$	1.0	$6.736e-01$	$7.659e-03$	1.0	$6.736e-01$
160	$6.25e-03$	$3.800e-03$	1.0	$6.432e-01$	$3.800e-03$	1.0	$6.432e-01$
320	$3.13e-03$	$1.893e-03$	1.0	$6.254e-01$	$1.893e-03$	1.0	$6.254e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.778e-02$			$6.778e-02$		
20	$5.00e-02$	$3.200e-02$	1.1	$8.198e-01$	$3.200e-02$	1.1	$8.198e-01$
40	$2.50e-02$	$1.555e-02$	1.0	$7.244e-01$	$1.555e-02$	1.0	$7.244e-01$
80	$1.25e-02$	$7.659e-03$	1.0	$6.736e-01$	$7.659e-03$	1.0	$6.736e-01$
160	$6.25e-03$	$3.800e-03$	1.0	$6.432e-01$	$3.800e-03$	1.0	$6.432e-01$
320	$3.13e-03$	$1.893e-03$	1.0	$6.254e-01$	$1.893e-03$	1.0	$6.254e-01$

Table 27: Numerical experiment `maerz0311` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.103e-02$			$5.103e-02$		
20	$5.00e-02$	$1.290e-02$	2.0	$4.918e+00$	$1.290e-02$	2.0	$4.918e+00$
40	$2.50e-02$	$3.235e-03$	2.0	$5.097e+00$	$3.235e-03$	2.0	$5.097e+00$
80	$1.25e-02$	$8.093e-04$	2.0	$5.156e+00$	$8.093e-04$	2.0	$5.156e+00$
160	$6.25e-03$	$2.023e-04$	2.0	$5.173e+00$	$2.023e-04$	2.0	$5.173e+00$
320	$3.13e-03$	$5.059e-05$	2.0	$5.178e+00$	$5.059e-05$	2.0	$5.178e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.738e-02$			$4.738e-02$		
20	$5.00e-02$	$1.199e-02$	2.0	$4.556e+00$	$1.199e-02$	2.0	$4.556e+00$
40	$2.50e-02$	$3.006e-03$	2.0	$4.731e+00$	$3.006e-03$	2.0	$4.731e+00$
80	$1.25e-02$	$7.521e-04$	2.0	$4.790e+00$	$7.521e-04$	2.0	$4.790e+00$
160	$6.25e-03$	$1.881e-04$	2.0	$4.807e+00$	$1.881e-04$	2.0	$4.807e+00$
320	$3.13e-03$	$4.701e-05$	2.0	$4.812e+00$	$4.701e-05$	2.0	$4.812e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.833e-02$			$3.833e-02$		
20	$5.00e-02$	$9.680e-03$	2.0	$3.708e+00$	$9.680e-03$	2.0	$3.708e+00$
40	$2.50e-02$	$2.426e-03$	2.0	$3.829e+00$	$2.426e-03$	2.0	$3.829e+00$
80	$1.25e-02$	$6.070e-04$	2.0	$3.868e+00$	$6.070e-04$	2.0	$3.868e+00$
160	$6.25e-03$	$1.518e-04$	2.0	$3.880e+00$	$1.518e-04$	2.0	$3.880e+00$
320	$3.13e-03$	$3.794e-05$	2.0	$3.884e+00$	$3.794e-05$	2.0	$3.884e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.759e-02$			$3.759e-02$		
20	$5.00e-02$	$9.493e-03$	2.0	$3.633e+00$	$9.493e-03$	2.0	$3.633e+00$
40	$2.50e-02$	$2.380e-03$	2.0	$3.755e+00$	$2.380e-03$	2.0	$3.755e+00$
80	$1.25e-02$	$5.953e-04$	2.0	$3.794e+00$	$5.953e-04$	2.0	$3.794e+00$
160	$6.25e-03$	$1.488e-04$	2.0	$3.806e+00$	$1.488e-04$	2.0	$3.806e+00$
320	$3.13e-03$	$3.721e-05$	2.0	$3.809e+00$	$3.721e-05$	2.0	$3.809e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.303e-04$			$1.038e-03$		
20	$5.00e-02$	$2.865e-05$	3.0	$2.337e-01$	$1.373e-04$	2.9	$8.614e-01$
40	$2.50e-02$	$3.576e-06$	3.0	$2.309e-01$	$1.764e-05$	3.0	$9.743e-01$
80	$1.25e-02$	$4.464e-07$	3.0	$2.304e-01$	$2.236e-06$	3.0	$1.049e+00$
160	$6.25e-03$	$5.576e-08$	3.0	$2.295e-01$	$2.814e-07$	3.0	$1.096e+00$
320	$3.13e-03$	$6.968e-09$	3.0	$2.289e-01$	$3.529e-08$	3.0	$1.124e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.303e-04$			$1.038e-03$		
20	$5.00e-02$	$2.865e-05$	3.0	$2.337e-01$	$1.373e-04$	2.9	$8.614e-01$
40	$2.50e-02$	$3.576e-06$	3.0	$2.309e-01$	$1.764e-05$	3.0	$9.743e-01$
80	$1.25e-02$	$4.464e-07$	3.0	$2.304e-01$	$2.236e-06$	3.0	$1.049e+00$
160	$6.25e-03$	$5.576e-08$	3.0	$2.295e-01$	$2.814e-07$	3.0	$1.096e+00$
320	$3.13e-03$	$6.968e-09$	3.0	$2.289e-01$	$3.529e-08$	3.0	$1.124e+00$

Table 28: Numerical experiment `maerz0311` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.351e-03$			$1.351e-03$		
20	$5.00e-02$	$9.099e-05$	3.9	$1.054e+01$	$9.099e-05$	3.9	$1.054e+01$
40	$2.50e-02$	$5.858e-06$	4.0	$1.281e+01$	$5.858e-06$	4.0	$1.281e+01$
80	$1.25e-02$	$3.718e-07$	4.0	$1.381e+01$	$3.718e-07$	4.0	$1.381e+01$
160	$6.25e-03$	$2.351e-08$	4.0	$1.414e+01$	$2.351e-08$	4.0	$1.414e+01$
320	$3.13e-03$	$1.486e-09$	4.0	$1.422e+01$	$1.486e-09$	4.0	$1.422e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.360e-03$			$1.360e-03$		
20	$5.00e-02$	$9.115e-05$	3.9	$1.079e+01$	$9.115e-05$	3.9	$1.079e+01$
40	$2.50e-02$	$5.817e-06$	4.0	$1.332e+01$	$5.817e-06$	4.0	$1.332e+01$
80	$1.25e-02$	$3.664e-07$	4.0	$1.430e+01$	$3.664e-07$	4.0	$1.430e+01$
160	$6.25e-03$	$2.300e-08$	4.0	$1.459e+01$	$2.300e-08$	4.0	$1.459e+01$
320	$3.13e-03$	$1.443e-09$	4.0	$1.463e+01$	$1.443e-09$	4.0	$1.463e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.249e-04$			$7.249e-04$		
20	$5.00e-02$	$4.858e-05$	3.9	$5.747e+00$	$4.858e-05$	3.9	$5.747e+00$
40	$2.50e-02$	$3.126e-06$	4.0	$6.855e+00$	$3.126e-06$	4.0	$6.855e+00$
80	$1.25e-02$	$1.984e-07$	4.0	$7.375e+00$	$1.984e-07$	4.0	$7.375e+00$
160	$6.25e-03$	$1.255e-08$	4.0	$7.545e+00$	$1.255e-08$	4.0	$7.545e+00$
320	$3.13e-03$	$7.923e-10$	4.0	$7.622e+00$	$7.923e-10$	4.0	$7.622e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.299e-04$			$7.299e-04$		
20	$5.00e-02$	$4.881e-05$	3.9	$5.830e+00$	$4.881e-05$	3.9	$5.830e+00$
40	$2.50e-02$	$3.113e-06$	4.0	$7.153e+00$	$3.113e-06$	4.0	$7.153e+00$
80	$1.25e-02$	$1.960e-07$	4.0	$7.662e+00$	$1.960e-07$	4.0	$7.662e+00$
160	$6.25e-03$	$1.231e-08$	4.0	$7.812e+00$	$1.231e-08$	4.0	$7.812e+00$
320	$3.13e-03$	$7.718e-10$	4.0	$7.856e+00$	$7.718e-10$	4.0	$7.856e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.293e-08$			$1.575e-05$		
20	$5.00e-02$	$2.640e-09$	4.8	$4.478e-03$	$1.036e-06$	3.9	$1.332e-01$
40	$2.50e-02$	$9.377e-11$	4.8	$4.855e-03$	$6.634e-08$	4.0	$1.490e-01$
80	$1.25e-02$	$3.284e-12$	4.8	$5.232e-03$	$4.197e-09$	4.0	$1.592e-01$
160	$6.25e-03$	$1.169e-13$	4.8	$4.717e-03$	$2.639e-10$	4.0	$1.655e-01$
320	$3.13e-03$	$1.399e-14$	3.1	$6.610e-07$	$1.654e-11$	4.0	$1.692e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.293e-08$			$1.575e-05$		
20	$5.00e-02$	$2.640e-09$	4.8	$4.478e-03$	$1.036e-06$	3.9	$1.332e-01$
40	$2.50e-02$	$9.377e-11$	4.8	$4.855e-03$	$6.634e-08$	4.0	$1.490e-01$
80	$1.25e-02$	$3.284e-12$	4.8	$5.232e-03$	$4.197e-09$	4.0	$1.592e-01$
160	$6.25e-03$	$1.169e-13$	4.8	$4.717e-03$	$2.639e-10$	4.0	$1.655e-01$
320	$3.13e-03$	$1.128e-14$	3.4	$3.205e-06$	$1.654e-11$	4.0	$1.692e-01$

Table 29: Numerical experiment `maerz0311` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.371e-04$			$2.371e-04$		
20	$5.00e-02$	$1.531e-05$	4.0	$2.127e+00$	$1.531e-05$	4.0	$2.127e+00$
40	$2.50e-02$	$9.727e-07$	4.0	$2.283e+00$	$9.727e-07$	4.0	$2.283e+00$
80	$1.25e-02$	$6.153e-08$	4.0	$2.336e+00$	$6.153e-08$	4.0	$2.336e+00$
160	$6.25e-03$	$3.887e-09$	4.0	$2.353e+00$	$3.887e-09$	4.0	$2.353e+00$
320	$3.13e-03$	$2.445e-10$	4.0	$2.434e+00$	$2.445e-10$	4.0	$2.434e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.353e-04$			$2.353e-04$		
20	$5.00e-02$	$1.507e-05$	4.0	$2.169e+00$	$1.507e-05$	4.0	$2.169e+00$
40	$2.50e-02$	$9.501e-07$	4.0	$2.321e+00$	$9.501e-07$	4.0	$2.321e+00$
80	$1.25e-02$	$5.968e-08$	4.0	$2.368e+00$	$5.968e-08$	4.0	$2.368e+00$
160	$6.25e-03$	$3.747e-09$	4.0	$2.377e+00$	$3.747e-09$	4.0	$2.377e+00$
320	$3.13e-03$	$2.346e-10$	4.0	$2.424e+00$	$2.346e-10$	4.0	$2.424e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.857e-05$			$8.857e-05$		
20	$5.00e-02$	$5.706e-06$	4.0	$8.007e-01$	$5.706e-06$	4.0	$8.007e-01$
40	$2.50e-02$	$3.623e-07$	4.0	$8.527e-01$	$3.623e-07$	4.0	$8.527e-01$
80	$1.25e-02$	$2.292e-08$	4.0	$8.708e-01$	$2.292e-08$	4.0	$8.708e-01$
160	$6.25e-03$	$1.448e-09$	4.0	$8.765e-01$	$1.448e-09$	4.0	$8.765e-01$
320	$3.13e-03$	$9.158e-11$	4.0	$8.691e-01$	$9.158e-11$	4.0	$8.691e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.903e-05$			$8.903e-05$		
20	$5.00e-02$	$5.688e-06$	4.0	$8.275e-01$	$5.688e-06$	4.0	$8.275e-01$
40	$2.50e-02$	$3.583e-07$	4.0	$8.798e-01$	$3.583e-07$	4.0	$8.798e-01$
80	$1.25e-02$	$2.249e-08$	4.0	$8.959e-01$	$2.249e-08$	4.0	$8.959e-01$
160	$6.25e-03$	$1.411e-09$	4.0	$8.989e-01$	$1.411e-09$	4.0	$8.989e-01$
320	$3.13e-03$	$8.865e-11$	4.0	$8.915e-01$	$8.865e-11$	4.0	$8.915e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.945e-10$			$1.292e-07$		
20	$5.00e-02$	$1.859e-11$	5.0	$5.935e-05$	$4.080e-09$	5.0	$1.247e-02$
40	$2.50e-02$	$5.881e-13$	5.0	$5.636e-05$	$1.281e-10$	5.0	$1.277e-02$
80	$1.25e-02$	$3.284e-14$	4.2	$2.743e-06$	$4.895e-12$	4.7	$4.509e-03$
160	$6.25e-03$	$2.988e-14$	0.1	$5.967e-14$	$2.181e-13$	4.5	$1.703e-03$
320	$3.13e-03$	$6.067e-14$	-1.0	$1.671e-16$	$6.950e-14$	1.6	$9.446e-10$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.945e-10$			$1.292e-07$		
20	$5.00e-02$	$1.859e-11$	5.0	$5.935e-05$	$4.080e-09$	5.0	$1.247e-02$
40	$2.50e-02$	$5.881e-13$	5.0	$5.636e-05$	$1.281e-10$	5.0	$1.277e-02$
80	$1.25e-02$	$3.284e-14$	4.2	$2.743e-06$	$4.895e-12$	4.7	$4.509e-03$
160	$6.25e-03$	$2.988e-14$	0.1	$5.967e-14$	$2.181e-13$	4.5	$1.703e-03$
320	$3.13e-03$	$6.059e-14$	-1.0	$1.688e-16$	$6.764e-14$	1.7	$1.152e-09$

Table 30: Numerical experiment `maerz0311` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.382e-06$			$7.382e-06$		
20	$5.00e-02$	$1.841e-07$	5.3	$1.562e+00$	$1.841e-07$	5.3	$1.562e+00$
40	$2.50e-02$	$6.411e-09$	4.8	$3.688e-01$	$6.411e-09$	4.8	$3.688e-01$
80	$1.25e-02$	$3.172e-10$	4.3	$5.691e-02$	$3.172e-10$	4.3	$5.691e-02$
160	$6.25e-03$	$1.943e-11$	4.0	$1.476e-02$	$1.943e-11$	4.0	$1.476e-02$
320	$3.13e-03$	$3.888e-12$	2.3	$2.540e-06$	$3.888e-12$	2.3	$2.540e-06$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.814e-06$			$6.814e-06$		
20	$5.00e-02$	$1.602e-07$	5.4	$1.753e+00$	$1.602e-07$	5.4	$1.753e+00$
40	$2.50e-02$	$5.395e-09$	4.9	$3.710e-01$	$5.395e-09$	4.9	$3.710e-01$
80	$1.25e-02$	$2.669e-10$	4.3	$4.789e-02$	$2.669e-10$	4.3	$4.789e-02$
160	$6.25e-03$	$1.462e-11$	4.2	$2.515e-02$	$1.462e-11$	4.2	$2.515e-02$
320	$3.13e-03$	$2.255e-12$	2.7	$1.288e-05$	$2.255e-12$	2.7	$1.288e-05$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.937e-06$			$1.937e-06$		
20	$5.00e-02$	$4.943e-08$	5.3	$3.800e-01$	$4.943e-08$	5.3	$3.800e-01$
40	$2.50e-02$	$1.778e-09$	4.8	$8.620e-02$	$1.778e-09$	4.8	$8.620e-02$
80	$1.25e-02$	$8.964e-11$	4.3	$1.427e-02$	$8.964e-11$	4.3	$1.427e-02$
160	$6.25e-03$	$5.500e-12$	4.0	$4.130e-03$	$5.500e-12$	4.0	$4.130e-03$
320	$3.13e-03$	$4.192e-13$	3.7	$8.422e-04$	$4.192e-13$	3.7	$8.422e-04$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.782e-06$			$1.782e-06$		
20	$5.00e-02$	$4.284e-08$	5.4	$4.258e-01$	$4.284e-08$	5.4	$4.258e-01$
40	$2.50e-02$	$1.496e-09$	4.8	$8.482e-02$	$1.496e-09$	4.8	$8.482e-02$
80	$1.25e-02$	$7.543e-11$	4.3	$1.201e-02$	$7.543e-11$	4.3	$1.201e-02$
160	$6.25e-03$	$4.389e-12$	4.1	$4.855e-03$	$4.389e-12$	4.1	$4.855e-03$
320	$3.13e-03$	$2.612e-13$	4.1	$4.116e-03$	$2.612e-13$	4.1	$4.116e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz0311	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.021e-11$			$4.980e-09$		
20	$5.00e-02$	$1.289e-12$	5.0	$3.692e-06$	$1.557e-10$	5.0	$4.977e-04$
40	$2.50e-02$	$1.061e-13$	3.6	$6.274e-08$	$4.930e-12$	5.0	$4.700e-04$
80	$1.25e-02$	$1.348e-13$	-0.3	$2.980e-14$	$2.855e-13$	4.1	$1.894e-05$
160	$6.25e-03$	$2.676e-13$	-1.0	$1.762e-15$	$2.723e-13$	0.1	$3.853e-13$
320	$3.13e-03$	$5.353e-13$	-1.0	$1.671e-15$	$5.355e-13$	-1.0	$1.926e-15$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.021e-11$			$4.980e-09$		
20	$5.00e-02$	$1.289e-12$	5.0	$3.692e-06$	$1.557e-10$	5.0	$4.977e-04$
40	$2.50e-02$	$1.061e-13$	3.6	$6.274e-08$	$4.930e-12$	5.0	$4.700e-04$
80	$1.25e-02$	$1.348e-13$	-0.3	$2.980e-14$	$2.855e-13$	4.1	$1.894e-05$
160	$6.25e-03$	$2.676e-13$	-1.0	$1.763e-15$	$2.723e-13$	0.1	$3.853e-13$
320	$3.13e-03$	$5.352e-13$	-1.0	$1.671e-15$	$5.356e-13$	-1.0	$1.922e-15$

Table 31: Numerical experiment `maerz0311` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for *x* at Grid tau**			**Error for *x* at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.467e-01$			$2.467e-01$		
20	$5.00e-02$	$7.296e-02$	1.8	$1.413e+01$	$7.296e-02$	1.8	$1.413e+01$
40	$2.50e-02$	$1.988e-02$	1.9	$2.012e+01$	$1.988e-02$	1.9	$2.012e+01$
80	$1.25e-02$	$5.191e-03$	1.9	$2.522e+01$	$5.191e-03$	1.9	$2.522e+01$
160	$6.25e-03$	$1.327e-03$	2.0	$2.891e+01$	$1.327e-03$	2.0	$2.891e+01$
320	$3.13e-03$	$3.353e-04$	2.0	$3.133e+01$	$3.353e-04$	2.0	$3.133e+01$

Uniform Mesh		**Error for *u* at Grid tau**			**Error for *u* at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.557e-01$			$1.557e-01$		
20	$5.00e-02$	$4.060e-02$	1.9	$1.354e+01$	$4.060e-02$	1.9	$1.354e+01$
40	$2.50e-02$	$1.026e-02$	2.0	$1.548e+01$	$1.026e-02$	2.0	$1.548e+01$
80	$1.25e-02$	$2.597e-03$	2.0	$1.538e+01$	$2.597e-03$	2.0	$1.538e+01$
160	$6.25e-03$	$6.541e-04$	2.0	$1.588e+01$	$6.541e-04$	2.0	$1.588e+01$
320	$3.13e-03$	$1.641e-04$	2.0	$1.633e+01$	$1.641e-04$	2.0	$1.633e+01$

Table 32: Numerical experiment `ewa0312` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.216e-02$			$5.216e-02$		
20	$5.00e-02$	$1.318e-02$	2.0	$5.040e+00$	$1.318e-02$	2.0	$5.040e+00$
40	$2.50e-02$	$3.304e-03$	2.0	$5.207e+00$	$3.304e-03$	2.0	$5.207e+00$
80	$1.25e-02$	$8.264e-04$	2.0	$5.267e+00$	$8.264e-04$	2.0	$5.267e+00$
160	$6.25e-03$	$2.066e-04$	2.0	$5.284e+00$	$2.066e-04$	2.0	$5.284e+00$
320	$3.13e-03$	$5.166e-05$	2.0	$5.288e+00$	$5.166e-05$	2.0	$5.288e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.669e-02$			$4.669e-02$		
20	$5.00e-02$	$1.181e-02$	2.0	$4.487e+00$	$1.181e-02$	2.0	$4.487e+00$
40	$2.50e-02$	$2.962e-03$	2.0	$4.664e+00$	$2.962e-03$	2.0	$4.664e+00$
80	$1.25e-02$	$7.412e-04$	2.0	$4.721e+00$	$7.412e-04$	2.0	$4.721e+00$
160	$6.25e-03$	$1.853e-04$	2.0	$4.738e+00$	$1.853e-04$	2.0	$4.738e+00$
320	$3.13e-03$	$4.633e-05$	2.0	$4.743e+00$	$4.633e-05$	2.0	$4.743e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.918e-02$			$3.918e-02$		
20	$5.00e-02$	$9.886e-03$	2.0	$3.798e+00$	$9.886e-03$	2.0	$3.798e+00$
40	$2.50e-02$	$2.478e-03$	2.0	$3.911e+00$	$2.478e-03$	2.0	$3.911e+00$
80	$1.25e-02$	$6.198e-04$	2.0	$3.952e+00$	$6.198e-04$	2.0	$3.952e+00$
160	$6.25e-03$	$1.550e-04$	2.0	$3.963e+00$	$1.550e-04$	2.0	$3.963e+00$
320	$3.13e-03$	$3.875e-05$	2.0	$3.966e+00$	$3.875e-05$	2.0	$3.966e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.694e-02$			$3.694e-02$		
20	$5.00e-02$	$9.332e-03$	2.0	$3.568e+00$	$9.332e-03$	2.0	$3.568e+00$
40	$2.50e-02$	$2.339e-03$	2.0	$3.690e+00$	$2.339e-03$	2.0	$3.690e+00$
80	$1.25e-02$	$5.852e-04$	2.0	$3.730e+00$	$5.852e-04$	2.0	$3.730e+00$
160	$6.25e-03$	$1.463e-04$	2.0	$3.741e+00$	$1.463e-04$	2.0	$3.741e+00$
320	$3.13e-03$	$3.658e-05$	2.0	$3.745e+00$	$3.658e-05$	2.0	$3.745e+00$

Table 33: Numerical experiment `ewa0312` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.968e-03$			$1.968e-03$		
20	$5.00e-02$	$1.499e-04$	3.7	$1.021e+01$	$1.499e-04$	3.7	$1.021e+01$
40	$2.50e-02$	$1.039e-05$	3.9	$1.534e+01$	$1.039e-05$	3.9	$1.534e+01$
80	$1.25e-02$	$6.846e-07$	3.9	$2.007e+01$	$6.846e-07$	3.9	$2.007e+01$
160	$6.25e-03$	$4.395e-08$	4.0	$2.367e+01$	$4.395e-08$	4.0	$2.367e+01$
320	$3.13e-03$	$2.784e-09$	4.0	$2.609e+01$	$2.784e-09$	4.0	$2.609e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.351e-03$			$1.351e-03$		
20	$5.00e-02$	$9.022e-05$	3.9	$1.085e+01$	$9.022e-05$	3.9	$1.085e+01$
40	$2.50e-02$	$5.739e-06$	4.0	$1.337e+01$	$5.739e-06$	4.0	$1.337e+01$
80	$1.25e-02$	$3.602e-07$	4.0	$1.436e+01$	$3.602e-07$	4.0	$1.436e+01$
160	$6.25e-03$	$2.254e-08$	4.0	$1.467e+01$	$2.254e-08$	4.0	$1.467e+01$
320	$3.13e-03$	$1.409e-09$	4.0	$1.473e+01$	$1.409e-09$	4.0	$1.473e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.054e-03$			$1.054e-03$		
20	$5.00e-02$	$8.013e-05$	3.7	$5.499e+00$	$8.013e-05$	3.7	$5.499e+00$
40	$2.50e-02$	$5.551e-06$	3.9	$8.221e+00$	$5.551e-06$	3.9	$8.221e+00$
80	$1.25e-02$	$3.657e-07$	3.9	$1.073e+01$	$3.657e-07$	3.9	$1.073e+01$
160	$6.25e-03$	$2.348e-08$	4.0	$1.265e+01$	$2.348e-08$	4.0	$1.265e+01$
320	$3.13e-03$	$1.487e-09$	4.0	$1.394e+01$	$1.487e-09$	4.0	$1.394e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.249e-04$			$7.249e-04$		
20	$5.00e-02$	$4.830e-05$	3.9	$5.859e+00$	$4.830e-05$	3.9	$5.859e+00$
40	$2.50e-02$	$3.071e-06$	4.0	$7.176e+00$	$3.071e-06$	4.0	$7.176e+00$
80	$1.25e-02$	$1.927e-07$	4.0	$7.690e+00$	$1.927e-07$	4.0	$7.690e+00$
160	$6.25e-03$	$1.206e-08$	4.0	$7.849e+00$	$1.206e-08$	4.0	$7.849e+00$
320	$3.13e-03$	$7.536e-10$	4.0	$7.902e+00$	$7.536e-10$	4.0	$7.902e+00$

Table 34: Numerical experiment `ewa0312` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.371e-04$			$2.371e-04$		
20	$5.00e-02$	$1.531e-05$	4.0	$2.127e+00$	$1.531e-05$	4.0	$2.127e+00$
40	$2.50e-02$	$9.727e-07$	4.0	$2.283e+00$	$9.727e-07$	4.0	$2.283e+00$
80	$1.25e-02$	$6.153e-08$	4.0	$2.336e+00$	$6.153e-08$	4.0	$2.336e+00$
160	$6.25e-03$	$3.887e-09$	4.0	$2.354e+00$	$3.887e-09$	4.0	$2.354e+00$
320	$3.13e-03$	$2.457e-10$	4.0	$2.348e+00$	$2.457e-10$	4.0	$2.348e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.330e-04$			$2.330e-04$		
20	$5.00e-02$	$1.487e-05$	4.0	$2.173e+00$	$1.487e-05$	4.0	$2.173e+00$
40	$2.50e-02$	$9.344e-07$	4.0	$2.327e+00$	$9.344e-07$	4.0	$2.327e+00$
80	$1.25e-02$	$5.847e-08$	4.0	$2.377e+00$	$5.847e-08$	4.0	$2.377e+00$
160	$6.25e-03$	$3.655e-09$	4.0	$2.392e+00$	$3.655e-09$	4.0	$2.392e+00$
320	$3.13e-03$	$2.284e-10$	4.0	$2.394e+00$	$2.284e-10$	4.0	$2.394e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.852e-05$			$8.852e-05$		
20	$5.00e-02$	$5.706e-06$	4.0	$7.989e-01$	$5.706e-06$	4.0	$7.989e-01$
40	$2.50e-02$	$3.623e-07$	4.0	$8.527e-01$	$3.623e-07$	4.0	$8.527e-01$
80	$1.25e-02$	$2.292e-08$	4.0	$8.708e-01$	$2.292e-08$	4.0	$8.708e-01$
160	$6.25e-03$	$1.448e-09$	4.0	$8.767e-01$	$1.448e-09$	4.0	$8.767e-01$
320	$3.13e-03$	$9.152e-11$	4.0	$8.730e-01$	$9.152e-11$	4.0	$8.730e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.813e-05$			$8.813e-05$		
20	$5.00e-02$	$5.613e-06$	4.0	$8.277e-01$	$5.613e-06$	4.0	$8.277e-01$
40	$2.50e-02$	$3.524e-07$	4.0	$8.804e-01$	$3.524e-07$	4.0	$8.804e-01$
80	$1.25e-02$	$2.205e-08$	4.0	$8.973e-01$	$2.205e-08$	4.0	$8.973e-01$
160	$6.25e-03$	$1.378e-09$	4.0	$9.021e-01$	$1.378e-09$	4.0	$9.021e-01$
320	$3.13e-03$	$8.620e-11$	4.0	$8.990e-01$	$8.620e-11$	4.0	$8.990e-01$

Table 35: Numerical experiment `ewa0312` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.277e-06$			$8.277e-06$		
20	$5.00e-02$	$1.841e-07$	5.5	$2.561e+00$	$1.841e-07$	5.5	$2.561e+00$
40	$2.50e-02$	$6.412e-09$	4.8	$3.688e-01$	$6.412e-09$	4.8	$3.688e-01$
80	$1.25e-02$	$3.177e-10$	4.3	$5.648e-02$	$3.177e-10$	4.3	$5.648e-02$
160	$6.25e-03$	$1.772e-11$	4.2	$2.675e-02$	$1.772e-11$	4.2	$2.675e-02$
320	$3.13e-03$	$1.117e-12$	4.0	$1.088e-02$	$1.117e-12$	4.0	$1.088e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.975e-06$			$5.975e-06$		
20	$5.00e-02$	$1.063e-07$	5.8	$3.885e+00$	$1.063e-07$	5.8	$3.885e+00$
40	$2.50e-02$	$1.799e-09$	5.9	$4.806e+00$	$1.799e-09$	5.9	$4.806e+00$
80	$1.25e-02$	$3.009e-11$	5.9	$5.139e+00$	$3.009e-11$	5.9	$5.139e+00$
160	$6.25e-03$	$4.158e-13$	6.2	$1.714e+01$	$4.158e-13$	6.2	$1.714e+01$
320	$3.13e-03$	$2.767e-13$	0.6	$8.206e-12$	$2.767e-13$	0.6	$8.206e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0312	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.134e-06$			$2.134e-06$		
20	$5.00e-02$	$4.943e-08$	5.4	$5.772e-01$	$4.943e-08$	5.4	$5.772e-01$
40	$2.50e-02$	$1.778e-09$	4.8	$8.620e-02$	$1.778e-09$	4.8	$8.620e-02$
80	$1.25e-02$	$8.964e-11$	4.3	$1.427e-02$	$8.964e-11$	4.3	$1.427e-02$
160	$6.25e-03$	$5.062e-12$	4.1	$6.978e-03$	$5.062e-12$	4.1	$6.978e-03$
320	$3.13e-03$	$5.318e-13$	3.3	$7.398e-05$	$5.318e-13$	3.3	$7.398e-05$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.539e-06$			$1.539e-06$		
20	$5.00e-02$	$2.731e-08$	5.8	$1.008e+00$	$2.731e-08$	5.8	$1.008e+00$
40	$2.50e-02$	$4.614e-10$	5.9	$1.247e+00$	$4.614e-10$	5.9	$1.247e+00$
80	$1.25e-02$	$7.616e-12$	5.9	$1.411e+00$	$7.616e-12$	5.9	$1.411e+00$
160	$6.25e-03$	$9.703e-14$	6.3	$7.254e+00$	$9.703e-14$	6.3	$7.254e+00$
320	$3.13e-03$	$1.532e-13$	-0.7	$3.420e-15$	$1.532e-13$	-0.7	$3.420e-15$

Table 36: Numerical experiment `ewa0312` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	**odeType**	**dim**	**AbsTol**	**degree**	**colpts**	**vec**
ewa0313	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.467e-01$			$2.467e-01$		
20	$5.00e-02$	$7.296e-02$	1.8	$1.413e+01$	$7.296e-02$	1.8	$1.413e+01$
40	$2.50e-02$	$1.988e-02$	1.9	$2.012e+01$	$1.988e-02$	1.9	$2.012e+01$
80	$1.25e-02$	$5.191e-03$	1.9	$2.522e+01$	$5.191e-03$	1.9	$2.522e+01$
160	$6.25e-03$	$1.327e-03$	2.0	$2.891e+01$	$1.327e-03$	2.0	$2.891e+01$
320	$3.13e-03$	$3.353e-04$	2.0	$3.133e+01$	$3.353e-04$	2.0	$3.133e+01$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.658e-01$			$1.658e-01$		
20	$5.00e-02$	$4.310e-02$	1.9	$1.455e+01$	$4.310e-02$	1.9	$1.455e+01$
40	$2.50e-02$	$1.089e-02$	2.0	$1.648e+01$	$1.089e-02$	2.0	$1.648e+01$
80	$1.25e-02$	$2.729e-03$	2.0	$1.717e+01$	$2.729e-03$	2.0	$1.717e+01$
160	$6.25e-03$	$6.828e-04$	2.0	$1.739e+01$	$6.828e-04$	2.0	$1.739e+01$
320	$3.13e-03$	$1.707e-04$	2.0	$1.746e+01$	$1.707e-04$	2.0	$1.746e+01$

Table 37: Numerical experiment `ewa0313` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.216e-02$			$5.216e-02$		
20	$5.00e-02$	$1.318e-02$	2.0	$5.040e+00$	$1.318e-02$	2.0	$5.040e+00$
40	$2.50e-02$	$3.304e-03$	2.0	$5.207e+00$	$3.304e-03$	2.0	$5.207e+00$
80	$1.25e-02$	$8.264e-04$	2.0	$5.267e+00$	$8.264e-04$	2.0	$5.267e+00$
160	$6.25e-03$	$2.066e-04$	2.0	$5.284e+00$	$2.066e-04$	2.0	$5.284e+00$
320	$3.13e-03$	$5.166e-05$	2.0	$5.288e+00$	$5.166e-05$	2.0	$5.288e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.103e-02$			$5.103e-02$		
20	$5.00e-02$	$1.290e-02$	2.0	$4.918e+00$	$1.290e-02$	2.0	$4.918e+00$
40	$2.50e-02$	$3.235e-03$	2.0	$5.097e+00$	$3.235e-03$	2.0	$5.097e+00$
80	$1.25e-02$	$8.093e-04$	2.0	$5.156e+00$	$8.093e-04$	2.0	$5.156e+00$
160	$6.25e-03$	$2.023e-04$	2.0	$5.173e+00$	$2.023e-04$	2.0	$5.173e+00$
320	$3.13e-03$	$5.059e-05$	2.0	$5.178e+00$	$5.059e-05$	2.0	$5.178e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.919e-02$			$3.919e-02$		
20	$5.00e-02$	$9.891e-03$	2.0	$3.795e+00$	$9.891e-03$	2.0	$3.795e+00$
40	$2.50e-02$	$2.479e-03$	2.0	$3.911e+00$	$2.479e-03$	2.0	$3.911e+00$
80	$1.25e-02$	$6.202e-04$	2.0	$3.954e+00$	$6.202e-04$	2.0	$3.954e+00$
160	$6.25e-03$	$1.551e-04$	2.0	$3.965e+00$	$1.551e-04$	2.0	$3.965e+00$
320	$3.13e-03$	$3.877e-05$	2.0	$3.969e+00$	$3.877e-05$	2.0	$3.969e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.833e-02$			$3.833e-02$		
20	$5.00e-02$	$9.680e-03$	2.0	$3.708e+00$	$9.680e-03$	2.0	$3.708e+00$
40	$2.50e-02$	$2.426e-03$	2.0	$3.829e+00$	$2.426e-03$	2.0	$3.829e+00$
80	$1.25e-02$	$6.070e-04$	2.0	$3.868e+00$	$6.070e-04$	2.0	$3.868e+00$
160	$6.25e-03$	$1.518e-04$	2.0	$3.880e+00$	$1.518e-04$	2.0	$3.880e+00$
320	$3.13e-03$	$3.794e-05$	2.0	$3.884e+00$	$3.794e-05$	2.0	$3.884e+00$

Table 38: Numerical experiment `ewa0313` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.897e-03$			$1.897e-03$		
20	$5.00e-02$	$1.451e-04$	3.7	$9.695e+00$	$1.451e-04$	3.7	$9.695e+00$
40	$2.50e-02$	$1.008e-05$	3.8	$1.471e+01$	$1.008e-05$	3.8	$1.471e+01$
80	$1.25e-02$	$6.649e-07$	3.9	$1.936e+01$	$6.649e-07$	3.9	$1.936e+01$
160	$6.25e-03$	$4.271e-08$	4.0	$2.292e+01$	$4.271e-08$	4.0	$2.292e+01$
320	$3.13e-03$	$2.706e-09$	4.0	$2.531e+01$	$2.706e-09$	4.0	$2.531e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.344e-03$			$1.344e-03$		
20	$5.00e-02$	$9.099e-05$	3.9	$1.031e+01$	$9.099e-05$	3.9	$1.031e+01$
40	$2.50e-02$	$5.858e-06$	4.0	$1.281e+01$	$5.858e-06$	4.0	$1.281e+01$
80	$1.25e-02$	$3.718e-07$	4.0	$1.381e+01$	$3.718e-07$	4.0	$1.381e+01$
160	$6.25e-03$	$2.352e-08$	4.0	$1.414e+01$	$2.352e-08$	4.0	$1.414e+01$
320	$3.13e-03$	$1.486e-09$	4.0	$1.419e+01$	$1.486e-09$	4.0	$1.419e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.014e-03$			$1.014e-03$		
20	$5.00e-02$	$7.744e-05$	3.7	$5.212e+00$	$7.744e-05$	3.7	$5.212e+00$
40	$2.50e-02$	$5.377e-06$	3.8	$7.867e+00$	$5.377e-06$	3.8	$7.867e+00$
80	$1.25e-02$	$3.546e-07$	3.9	$1.033e+01$	$3.546e-07$	3.9	$1.033e+01$
160	$6.25e-03$	$2.278e-08$	4.0	$1.222e+01$	$2.278e-08$	4.0	$1.222e+01$
320	$3.13e-03$	$1.443e-09$	4.0	$1.350e+01$	$1.443e-09$	4.0	$1.350e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.190e-04$			$7.190e-04$		
20	$5.00e-02$	$4.858e-05$	3.9	$5.547e+00$	$4.858e-05$	3.9	$5.547e+00$
40	$2.50e-02$	$3.126e-06$	4.0	$6.855e+00$	$3.126e-06$	4.0	$6.855e+00$
80	$1.25e-02$	$1.984e-07$	4.0	$7.375e+00$	$1.984e-07$	4.0	$7.375e+00$
160	$6.25e-03$	$1.255e-08$	4.0	$7.545e+00$	$1.255e-08$	4.0	$7.545e+00$
320	$3.13e-03$	$7.925e-10$	4.0	$7.613e+00$	$7.925e-10$	4.0	$7.613e+00$

Table 39: Numerical experiment `ewa0313` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	4	e	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.381e-04$			$2.381e-04$		
20	$5.00e-02$	$1.539e-05$	4.0	$2.130e+00$	$1.539e-05$	4.0	$2.130e+00$
40	$2.50e-02$	$9.778e-07$	4.0	$2.291e+00$	$9.778e-07$	4.0	$2.291e+00$
80	$1.25e-02$	$6.186e-08$	4.0	$2.346e+00$	$6.186e-08$	4.0	$2.346e+00$
160	$6.25e-03$	$3.909e-09$	4.0	$2.365e+00$	$3.909e-09$	4.0	$2.365e+00$
320	$3.13e-03$	$2.479e-10$	4.0	$2.303e+00$	$2.479e-10$	4.0	$2.303e+00$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.371e-04$			$2.371e-04$		
20	$5.00e-02$	$1.531e-05$	4.0	$2.127e+00$	$1.531e-05$	4.0	$2.127e+00$
40	$2.50e-02$	$9.727e-07$	4.0	$2.283e+00$	$9.727e-07$	4.0	$2.283e+00$
80	$1.25e-02$	$6.153e-08$	4.0	$2.336e+00$	$6.153e-08$	4.0	$2.336e+00$
160	$6.25e-03$	$3.888e-09$	4.0	$2.353e+00$	$3.888e-09$	4.0	$2.353e+00$
320	$3.13e-03$	$2.465e-10$	4.0	$2.290e+00$	$2.465e-10$	4.0	$2.290e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	4	g	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.897e-05$			$8.897e-05$		
20	$5.00e-02$	$5.739e-06$	4.0	$8.008e-01$	$5.739e-06$	4.0	$8.008e-01$
40	$2.50e-02$	$3.646e-07$	4.0	$8.561e-01$	$3.646e-07$	4.0	$8.561e-01$
80	$1.25e-02$	$2.306e-08$	4.0	$8.752e-01$	$2.306e-08$	4.0	$8.752e-01$
160	$6.25e-03$	$1.457e-09$	4.0	$8.820e-01$	$1.457e-09$	4.0	$8.820e-01$
320	$3.13e-03$	$9.203e-11$	4.0	$8.850e-01$	$9.203e-11$	4.0	$8.850e-01$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.852e-05$			$8.852e-05$		
20	$5.00e-02$	$5.706e-06$	4.0	$7.989e-01$	$5.706e-06$	4.0	$7.989e-01$
40	$2.50e-02$	$3.623e-07$	4.0	$8.527e-01$	$3.623e-07$	4.0	$8.527e-01$
80	$1.25e-02$	$2.292e-08$	4.0	$8.708e-01$	$2.292e-08$	4.0	$8.708e-01$
160	$6.25e-03$	$1.448e-09$	4.0	$8.768e-01$	$1.448e-09$	4.0	$8.768e-01$
320	$3.13e-03$	$9.143e-11$	4.0	$8.793e-01$	$9.143e-11$	4.0	$8.793e-01$

Table 40: Numerical experiment `ewa0313` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.258e-06$			$8.258e-06$		
20	$5.00e-02$	$1.902e-07$	5.4	$2.276e+00$	$1.902e-07$	5.4	$2.276e+00$
40	$2.50e-02$	$6.610e-09$	4.8	$3.842e-01$	$6.610e-09$	4.8	$3.842e-01$
80	$1.25e-02$	$3.235e-10$	4.4	$6.216e-02$	$3.235e-10$	4.4	$6.216e-02$
160	$6.25e-03$	$1.998e-11$	4.0	$1.430e-02$	$1.998e-11$	4.0	$1.430e-02$
320	$3.13e-03$	$4.898e-12$	2.0	$5.906e-07$	$4.898e-12$	2.0	$5.906e-07$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.382e-06$			$7.382e-06$		
20	$5.00e-02$	$1.841e-07$	5.3	$1.562e+00$	$1.841e-07$	5.3	$1.562e+00$
40	$2.50e-02$	$6.496e-09$	4.8	$3.486e-01$	$6.496e-09$	4.8	$3.486e-01$
80	$1.25e-02$	$3.219e-10$	4.3	$5.720e-02$	$3.219e-10$	4.3	$5.720e-02$
160	$6.25e-03$	$1.984e-11$	4.0	$1.441e-02$	$1.984e-11$	4.0	$1.441e-02$
320	$3.13e-03$	$4.797e-12$	2.0	$6.484e-07$	$4.797e-12$	2.0	$6.484e-07$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0313	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.131e-06$			$2.131e-06$		
20	$5.00e-02$	$5.111e-08$	5.4	$5.133e-01$	$5.111e-08$	5.4	$5.133e-01$
40	$2.50e-02$	$1.833e-09$	4.8	$9.032e-02$	$1.833e-09$	4.8	$9.032e-02$
80	$1.25e-02$	$9.141e-11$	4.3	$1.558e-02$	$9.141e-11$	4.3	$1.558e-02$
160	$6.25e-03$	$5.285e-12$	4.1	$6.129e-03$	$5.285e-12$	4.1	$6.129e-03$
320	$3.13e-03$	$4.277e-13$	3.6	$5.223e-04$	$4.277e-13$	3.6	$5.223e-04$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.937e-06$			$1.937e-06$		
20	$5.00e-02$	$4.943e-08$	5.3	$3.800e-01$	$4.943e-08$	5.3	$3.800e-01$
40	$2.50e-02$	$1.803e-09$	4.8	$8.112e-02$	$1.803e-09$	4.8	$8.112e-02$
80	$1.25e-02$	$9.098e-11$	4.3	$1.441e-02$	$9.098e-11$	4.3	$1.441e-02$
160	$6.25e-03$	$5.232e-12$	4.1	$6.305e-03$	$5.232e-12$	4.1	$6.305e-03$
320	$3.13e-03$	$1.709e-13$	4.9	$3.975e-01$	$1.709e-13$	4.9	$3.975e-01$

Table 41: Numerical experiment `ewa0313` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.497e-02$			$1.312e-01$		
20	$5.00e-02$	$2.312e-02$	2.0	$1.037e+01$	$3.296e-02$	2.0	$1.289e+01$
40	$2.50e-02$	$5.874e-03$	2.0	$8.635e+00$	$8.186e-03$	2.0	$1.357e+01$
80	$1.25e-02$	$1.478e-03$	2.0	$9.087e+00$	$2.039e-03$	2.0	$1.334e+01$
160	$6.25e-03$	$3.690e-04$	2.0	$9.529e+00$	$5.099e-04$	2.0	$1.305e+01$
320	$3.13e-03$	$9.233e-05$	2.0	$9.384e+00$	$1.274e-04$	2.0	$1.307e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.561e-02$			$1.055e-01$		
20	$5.00e-02$	$2.029e-02$	1.9	$5.973e+00$	$2.456e-02$	2.1	$1.336e+01$
40	$2.50e-02$	$4.970e-03$	2.0	$8.876e+00$	$6.141e-03$	2.0	$9.808e+00$
80	$1.25e-02$	$1.237e-03$	2.0	$8.150e+00$	$1.533e-03$	2.0	$9.894e+00$
160	$6.25e-03$	$3.098e-04$	2.0	$7.813e+00$	$3.829e-04$	2.0	$9.877e+00$
320	$3.13e-03$	$7.742e-05$	2.0	$7.950e+00$	$9.573e-05$	2.0	$9.806e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.142e+00$			$1.142e+00$		
20	$5.00e-02$	$5.977e-01$	0.9	$9.798e+00$	$5.977e-01$	0.9	$9.798e+00$
40	$2.50e-02$	$3.105e-01$	0.9	$1.014e+01$	$3.105e-01$	0.9	$1.014e+01$
80	$1.25e-02$	$1.575e-01$	1.0	$1.148e+01$	$1.575e-01$	1.0	$1.148e+01$
160	$6.25e-03$	$7.936e-02$	1.0	$1.202e+01$	$7.936e-02$	1.0	$1.202e+01$
320	$3.13e-03$	$3.984e-02$	1.0	$1.234e+01$	$3.984e-02$	1.0	$1.234e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.069e+00$			$1.069e+00$		
20	$5.00e-02$	$5.583e-01$	0.9	$9.251e+00$	$5.583e-01$	0.9	$9.251e+00$
40	$2.50e-02$	$2.855e-01$	1.0	$1.014e+01$	$2.855e-01$	1.0	$1.014e+01$
80	$1.25e-02$	$1.444e-01$	1.0	$1.075e+01$	$1.444e-01$	1.0	$1.075e+01$
160	$6.25e-03$	$7.260e-02$	1.0	$1.114e+01$	$7.260e-02$	1.0	$1.114e+01$
320	$3.13e-03$	$3.640e-02$	1.0	$1.137e+01$	$3.640e-02$	1.0	$1.137e+01$

Table 42: Numerical experiment `ewa0411` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.668e-02$			$5.115e-02$		
20	$5.00e-02$	$1.185e-02$	2.0	$4.442e+00$	$1.337e-02$	1.9	$4.416e+00$
40	$2.50e-02$	$2.994e-03$	2.0	$4.519e+00$	$3.359e-03$	2.0	$5.228e+00$
80	$1.25e-02$	$7.482e-04$	2.0	$4.802e+00$	$8.400e-04$	2.0	$5.367e+00$
160	$6.25e-03$	$1.872e-04$	2.0	$4.756e+00$	$2.101e-04$	2.0	$5.356e+00$
320	$3.13e-03$	$4.681e-05$	2.0	$4.795e+00$	$5.254e-05$	2.0	$5.377e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.252e-02$			$4.238e-02$		
20	$5.00e-02$	$8.418e-03$	1.9	$2.898e+00$	$1.055e-02$	2.0	$4.302e+00$
40	$2.50e-02$	$2.102e-03$	2.0	$3.386e+00$	$2.671e-03$	2.0	$3.993e+00$
80	$1.25e-02$	$5.280e-04$	2.0	$3.276e+00$	$6.695e-04$	2.0	$4.210e+00$
160	$6.25e-03$	$1.320e-04$	2.0	$3.381e+00$	$1.674e-04$	2.0	$4.283e+00$
320	$3.13e-03$	$3.300e-05$	2.0	$3.379e+00$	$4.185e-05$	2.0	$4.286e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.748e-02$			$2.748e-02$		
20	$5.00e-02$	$6.859e-03$	2.0	$2.762e+00$	$6.859e-03$	2.0	$2.762e+00$
40	$2.50e-02$	$1.705e-03$	2.0	$2.815e+00$	$1.705e-03$	2.0	$2.815e+00$
80	$1.25e-02$	$4.256e-04$	2.0	$2.746e+00$	$4.256e-04$	2.0	$2.746e+00$
160	$6.25e-03$	$1.064e-04$	2.0	$2.722e+00$	$1.064e-04$	2.0	$2.722e+00$
320	$3.13e-03$	$2.660e-05$	2.0	$2.726e+00$	$2.660e-05$	2.0	$2.726e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.207e-02$			$2.207e-02$		
20	$5.00e-02$	$5.460e-03$	2.0	$2.286e+00$	$5.460e-03$	2.0	$2.286e+00$
40	$2.50e-02$	$1.363e-03$	2.0	$2.195e+00$	$1.363e-03$	2.0	$2.195e+00$
80	$1.25e-02$	$3.404e-04$	2.0	$2.197e+00$	$3.404e-04$	2.0	$2.197e+00$
160	$6.25e-03$	$8.511e-05$	2.0	$2.178e+00$	$8.511e-05$	2.0	$2.178e+00$
320	$3.13e-03$	$2.127e-05$	2.0	$2.180e+00$	$2.127e-05$	2.0	$2.180e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.578e-02$			$4.171e-02$		
20	$5.00e-02$	$2.034e-03$	3.0	$1.427e+01$	$5.253e-03$	3.0	$4.068e+01$
40	$2.50e-02$	$2.544e-04$	3.0	$1.624e+01$	$6.691e-04$	3.0	$3.875e+01$
80	$1.25e-02$	$3.186e-05$	3.0	$1.611e+01$	$8.418e-05$	3.0	$4.138e+01$
160	$6.25e-03$	$3.988e-06$	3.0	$1.617e+01$	$1.055e-05$	3.0	$4.243e+01$
320	$3.13e-03$	$4.988e-07$	3.0	$1.626e+01$	$1.320e-06$	3.0	$4.284e+01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.490e-02$			$2.723e-02$		
20	$5.00e-02$	$1.846e-03$	3.0	$1.534e+01$	$3.634e-03$	2.9	$2.191e+01$
40	$2.50e-02$	$2.308e-04$	3.0	$1.474e+01$	$4.597e-04$	3.0	$2.759e+01$
80	$1.25e-02$	$2.889e-05$	3.0	$1.467e+01$	$5.752e-05$	3.0	$2.928e+01$
160	$6.25e-03$	$3.615e-06$	3.0	$1.470e+01$	$7.196e-06$	3.0	$2.931e+01$
320	$3.13e-03$	$4.522e-07$	3.0	$1.475e+01$	$8.997e-07$	3.0	$2.942e+01$

Table 43: Numerical experiment `ewa0411` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.989e-03$			$2.989e-03$		
20	$5.00e-02$	$1.760e-04$	4.1	$3.643e+01$	$1.829e-04$	4.0	$3.205e+01$
40	$2.50e-02$	$1.105e-05$	4.0	$2.766e+01$	$1.136e-05$	4.0	$3.015e+01$
80	$1.25e-02$	$6.874e-07$	4.0	$2.895e+01$	$7.079e-07$	4.0	$2.948e+01$
160	$6.25e-03$	$4.293e-08$	4.0	$2.829e+01$	$4.423e-08$	4.0	$2.905e+01$
320	$3.13e-03$	$2.680e-09$	4.0	$2.841e+01$	$2.760e-09$	4.0	$2.932e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.467e-03$			$2.578e-03$		
20	$5.00e-02$	$1.453e-04$	4.1	$3.007e+01$	$1.529e-04$	4.1	$3.069e+01$
40	$2.50e-02$	$8.942e-06$	4.0	$2.483e+01$	$9.532e-06$	4.0	$2.473e+01$
80	$1.25e-02$	$5.567e-07$	4.0	$2.336e+01$	$5.949e-07$	4.0	$2.458e+01$
160	$6.25e-03$	$3.479e-08$	4.0	$2.283e+01$	$3.715e-08$	4.0	$2.449e+01$
320	$3.13e-03$	$2.171e-09$	4.0	$2.306e+01$	$2.318e-09$	4.0	$2.470e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.524e-03$			$1.524e-03$		
20	$5.00e-02$	$1.020e-04$	3.9	$1.214e+01$	$1.020e-04$	3.9	$1.214e+01$
40	$2.50e-02$	$6.272e-06$	4.0	$1.752e+01$	$6.272e-06$	4.0	$1.752e+01$
80	$1.25e-02$	$3.904e-07$	4.0	$1.641e+01$	$3.904e-07$	4.0	$1.641e+01$
160	$6.25e-03$	$2.438e-08$	4.0	$1.609e+01$	$2.438e-08$	4.0	$1.609e+01$
320	$3.13e-03$	$1.525e-09$	4.0	$1.588e+01$	$1.525e-09$	4.0	$1.588e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.263e-03$			$1.263e-03$		
20	$5.00e-02$	$7.820e-05$	4.0	$1.305e+01$	$7.820e-05$	4.0	$1.305e+01$
40	$2.50e-02$	$4.837e-06$	4.0	$1.309e+01$	$4.837e-06$	4.0	$1.309e+01$
80	$1.25e-02$	$3.024e-07$	4.0	$1.236e+01$	$3.024e-07$	4.0	$1.236e+01$
160	$6.25e-03$	$1.888e-08$	4.0	$1.246e+01$	$1.888e-08$	4.0	$1.246e+01$
320	$3.13e-03$	$1.184e-09$	4.0	$1.209e+01$	$1.184e-09$	4.0	$1.209e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.329e-05$			$1.377e-03$		
20	$5.00e-02$	$1.330e-06$	5.0	$4.584e+00$	$9.627e-05$	3.8	$9.476e+00$
40	$2.50e-02$	$4.128e-08$	5.0	$4.377e+00$	$6.195e-06$	4.0	$1.358e+01$
80	$1.25e-02$	$1.286e-09$	5.0	$4.290e+00$	$3.903e-07$	4.0	$1.520e+01$
160	$6.25e-03$	$4.022e-11$	5.0	$4.202e+00$	$2.445e-08$	4.0	$1.575e+01$
320	$3.13e-03$	$1.341e-12$	4.9	$2.626e+00$	$1.530e-09$	4.0	$1.589e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.920e-05$			$1.137e-03$		
20	$5.00e-02$	$1.204e-06$	5.0	$4.153e+00$	$7.017e-05$	4.0	$1.185e+01$
40	$2.50e-02$	$3.737e-08$	5.0	$3.963e+00$	$4.427e-06$	4.0	$1.078e+01$
80	$1.25e-02$	$1.165e-09$	5.0	$3.884e+00$	$2.764e-07$	4.0	$1.139e+01$
160	$6.25e-03$	$3.638e-11$	5.0	$3.827e+00$	$1.726e-08$	4.0	$1.141e+01$
320	$3.13e-03$	$1.147e-12$	5.0	$3.572e+00$	$1.078e-09$	4.0	$1.134e+01$

Table 44: Numerical experiment `ewa0411` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.944e-04$			$3.944e-04$		
20	$5.00e-02$	$2.411e-05$	4.0	$4.249e+00$	$2.411e-05$	4.0	$4.249e+00$
40	$2.50e-02$	$1.506e-06$	4.0	$3.868e+00$	$1.506e-06$	4.0	$3.868e+00$
80	$1.25e-02$	$9.409e-08$	4.0	$3.856e+00$	$9.409e-08$	4.0	$3.856e+00$
160	$6.25e-03$	$5.877e-09$	4.0	$3.869e+00$	$5.877e-09$	4.0	$3.869e+00$
320	$3.13e-03$	$3.620e-10$	4.0	$4.281e+00$	$3.620e-10$	4.0	$4.281e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.461e-04$			$3.461e-04$		
20	$5.00e-02$	$2.115e-05$	4.0	$3.728e+00$	$2.115e-05$	4.0	$3.728e+00$
40	$2.50e-02$	$1.315e-06$	4.0	$3.467e+00$	$1.315e-06$	4.0	$3.467e+00$
80	$1.25e-02$	$8.206e-08$	4.0	$3.391e+00$	$8.206e-08$	4.0	$3.391e+00$
160	$6.25e-03$	$5.124e-09$	4.0	$3.382e+00$	$5.124e-09$	4.0	$3.382e+00$
320	$3.13e-03$	$3.245e-10$	4.0	$3.050e+00$	$3.245e-10$	4.0	$3.050e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.154e-04$			$2.154e-04$		
20	$5.00e-02$	$1.316e-05$	4.0	$2.325e+00$	$1.316e-05$	4.0	$2.325e+00$
40	$2.50e-02$	$8.189e-07$	4.0	$2.144e+00$	$8.189e-07$	4.0	$2.144e+00$
80	$1.25e-02$	$5.118e-08$	4.0	$2.095e+00$	$5.118e-08$	4.0	$2.095e+00$
160	$6.25e-03$	$3.198e-09$	4.0	$2.101e+00$	$3.198e-09$	4.0	$2.101e+00$
320	$3.13e-03$	$1.976e-10$	4.0	$2.280e+00$	$1.976e-10$	4.0	$2.280e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.648e-04$			$1.648e-04$		
20	$5.00e-02$	$1.032e-05$	4.0	$1.633e+00$	$1.032e-05$	4.0	$1.633e+00$
40	$2.50e-02$	$6.418e-07$	4.0	$1.690e+00$	$6.418e-07$	4.0	$1.690e+00$
80	$1.25e-02$	$4.007e-08$	4.0	$1.654e+00$	$4.007e-08$	4.0	$1.654e+00$
160	$6.25e-03$	$2.503e-09$	4.0	$1.646e+00$	$2.503e-09$	4.0	$1.646e+00$
320	$3.13e-03$	$1.525e-10$	4.0	$1.976e+00$	$1.525e-10$	4.0	$1.976e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.738e-08$			$8.032e-05$		
20	$5.00e-02$	$2.238e-10$	6.9	$2.353e-01$	$2.497e-06$	5.0	$8.168e+00$
40	$2.50e-02$	$1.798e-12$	7.0	$2.543e-01$	$8.010e-08$	5.0	$7.141e+00$
80	$1.25e-02$	$1.685e-13$	3.4	$5.319e-07$	$2.517e-09$	5.0	$7.968e+00$
160	$6.25e-03$	$3.441e-13$	-1.0	$1.850e-15$	$7.872e-11$	5.0	$8.202e+00$
320	$3.13e-03$	$5.886e-13$	-0.8	$6.746e-15$	$2.594e-12$	4.9	$5.596e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.615e-08$			$4.731e-05$		
20	$5.00e-02$	$2.103e-10$	7.0	$2.378e-01$	$1.501e-06$	5.0	$4.502e+00$
40	$2.50e-02$	$1.702e-12$	6.9	$2.310e-01$	$4.698e-08$	5.0	$4.767e+00$
80	$1.25e-02$	$1.417e-13$	3.6	$9.466e-07$	$1.468e-09$	5.0	$4.808e+00$
160	$6.25e-03$	$2.920e-13$	-1.0	$1.466e-15$	$4.617e-11$	5.0	$4.626e+00$
320	$3.13e-03$	$4.431e-13$	-0.6	$1.377e-14$	$1.877e-12$	4.6	$7.042e-01$

Table 45: Numerical experiment `ewa0411` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.850e-05$			$1.850e-05$		
20	$5.00e-02$	$3.135e-07$	5.9	$1.414e+01$	$3.135e-07$	5.9	$1.414e+01$
40	$2.50e-02$	$4.816e-09$	6.0	$2.160e+01$	$4.816e-09$	6.0	$2.160e+01$
80	$1.25e-02$	$7.742e-11$	6.0	$1.696e+01$	$7.833e-11$	5.9	$1.594e+01$
160	$6.25e-03$	$3.653e-11$	1.1	$8.935e-09$	$3.653e-11$	1.1	$9.729e-09$
320	$3.13e-03$	$7.547e-11$	-1.0	$1.800e-13$	$7.547e-11$	-1.0	$1.800e-13$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.526e-05$			$1.542e-05$		
20	$5.00e-02$	$2.398e-07$	6.0	$1.497e+01$	$2.398e-07$	6.0	$1.566e+01$
40	$2.50e-02$	$3.701e-09$	6.0	$1.619e+01$	$3.701e-09$	6.0	$1.619e+01$
80	$1.25e-02$	$6.763e-11$	5.8	$6.589e+00$	$6.890e-11$	5.7	$5.965e+00$
160	$6.25e-03$	$1.777e-11$	1.9	$3.162e-07$	$1.777e-11$	2.0	$3.626e-07$
320	$3.13e-03$	$3.414e-11$	-0.9	$1.488e-13$	$3.414e-11$	-0.9	$1.488e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.211e-06$			$5.211e-06$		
20	$5.00e-02$	$8.271e-08$	6.0	$4.946e+00$	$8.271e-08$	6.0	$4.946e+00$
40	$2.50e-02$	$1.273e-09$	6.0	$5.657e+00$	$1.273e-09$	6.0	$5.657e+00$
80	$1.25e-02$	$1.959e-11$	6.0	$5.653e+00$	$1.959e-11$	6.0	$5.653e+00$
160	$6.25e-03$	$3.941e-12$	2.3	$4.946e-07$	$3.941e-12$	2.3	$4.946e-07$
320	$3.13e-03$	$5.449e-12$	-0.5	$3.672e-13$	$5.449e-12$	-0.5	$3.672e-13$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.989e-06$			$3.989e-06$		
20	$5.00e-02$	$6.326e-08$	6.0	$3.796e+00$	$6.326e-08$	6.0	$3.796e+00$
40	$2.50e-02$	$9.733e-10$	6.0	$4.329e+00$	$9.733e-10$	6.0	$4.329e+00$
80	$1.25e-02$	$1.534e-11$	6.0	$3.807e+00$	$1.534e-11$	6.0	$3.807e+00$
160	$6.25e-03$	$2.073e-12$	2.9	$4.798e-06$	$2.073e-12$	2.9	$4.798e-06$
320	$3.13e-03$	$1.803e-12$	0.2	$5.766e-12$	$1.803e-12$	0.2	$5.766e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0411	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.643e-11$			$2.456e-06$		
20	$5.00e-02$	$3.353e-13$	7.1	$6.033e-04$	$4.235e-08$	5.9	$1.771e+00$
40	$2.50e-02$	$6.706e-13$	-1.0	$1.676e-14$	$6.791e-10$	6.0	$2.423e+00$
80	$1.25e-02$	$1.319e-12$	-1.0	$1.832e-14$	$1.137e-11$	5.9	$1.929e+00$
160	$6.25e-03$	$2.589e-12$	-1.0	$1.855e-14$	$2.610e-12$	2.1	$1.246e-07$
320	$3.13e-03$	$4.939e-12$	-0.9	$2.287e-14$	$4.942e-12$	-0.9	$2.435e-14$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.460e-11$			$1.956e-06$		
20	$5.00e-02$	$3.015e-13$	6.8	$2.405e-04$	$3.075e-08$	6.0	$1.914e+00$
40	$2.50e-02$	$6.081e-13$	-1.0	$1.455e-14$	$4.819e-10$	6.0	$1.944e+00$
80	$1.25e-02$	$1.206e-12$	-1.0	$1.589e-14$	$8.322e-12$	5.9	$1.159e+00$
160	$6.25e-03$	$2.361e-12$	-1.0	$1.728e-14$	$2.376e-12$	1.8	$2.302e-08$
320	$3.13e-03$	$4.465e-12$	-0.9	$2.221e-14$	$4.468e-12$	-0.9	$2.331e-14$

Table 46: Numerical experiment `ewa0411` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.752e-03$			$3.752e-03$		
20	$5.00e-02$	$9.393e-04$	2.0	$3.734e-01$	$9.393e-04$	2.0	$3.734e-01$
40	$2.50e-02$	$2.349e-04$	2.0	$3.751e-01$	$2.349e-04$	2.0	$3.751e-01$
80	$1.25e-02$	$5.873e-05$	2.0	$3.757e-01$	$5.873e-05$	2.0	$3.757e-01$
160	$6.25e-03$	$1.468e-05$	2.0	$3.758e-01$	$1.468e-05$	2.0	$3.758e-01$
320	$3.13e-03$	$3.671e-06$	2.0	$3.759e-01$	$3.671e-06$	2.0	$3.759e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.237e-03$			$2.127e-03$		
20	$5.00e-02$	$3.134e-04$	2.0	$1.183e-01$	$5.335e-04$	2.0	$2.106e-01$
40	$2.50e-02$	$7.861e-05$	2.0	$1.236e-01$	$1.335e-04$	2.0	$2.127e-01$
80	$1.25e-02$	$1.967e-05$	2.0	$1.252e-01$	$3.337e-05$	2.0	$2.133e-01$
160	$6.25e-03$	$4.918e-06$	2.0	$1.257e-01$	$8.344e-06$	2.0	$2.135e-01$
320	$3.13e-03$	$1.230e-06$	2.0	$1.259e-01$	$2.086e-06$	2.0	$2.136e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.913e-02$			$4.913e-02$		
20	$5.00e-02$	$2.479e-02$	1.0	$4.766e-01$	$2.479e-02$	1.0	$4.766e-01$
40	$2.50e-02$	$1.245e-02$	1.0	$4.867e-01$	$1.245e-02$	1.0	$4.867e-01$
80	$1.25e-02$	$6.237e-03$	1.0	$4.925e-01$	$6.237e-03$	1.0	$4.925e-01$
160	$6.25e-03$	$3.122e-03$	1.0	$4.958e-01$	$3.122e-03$	1.0	$4.958e-01$
320	$3.13e-03$	$1.562e-03$	1.0	$4.976e-01$	$1.562e-03$	1.0	$4.976e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.913e-02$			$4.913e-02$		
20	$5.00e-02$	$2.479e-02$	1.0	$4.766e-01$	$2.479e-02$	1.0	$4.766e-01$
40	$2.50e-02$	$1.245e-02$	1.0	$4.867e-01$	$1.245e-02$	1.0	$4.867e-01$
80	$1.25e-02$	$6.237e-03$	1.0	$4.925e-01$	$6.237e-03$	1.0	$4.925e-01$
160	$6.25e-03$	$3.122e-03$	1.0	$4.958e-01$	$3.122e-03$	1.0	$4.958e-01$
320	$3.13e-03$	$1.562e-03$	1.0	$4.976e-01$	$1.562e-03$	1.0	$4.976e-01$

Table 47: Numerical experiment `ewa0412` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.703e-04$			$2.396e-04$		
20	$5.00e-02$	$4.257e-05$	2.0	$1.704e-02$	$6.225e-05$	1.9	$2.109e-02$
40	$2.50e-02$	$1.064e-05$	2.0	$1.703e-02$	$1.586e-05$	2.0	$2.294e-02$
80	$1.25e-02$	$2.660e-06$	2.0	$1.703e-02$	$4.003e-06$	2.0	$2.414e-02$
160	$6.25e-03$	$6.651e-07$	2.0	$1.703e-02$	$1.005e-06$	2.0	$2.487e-02$
320	$3.13e-03$	$1.663e-07$	2.0	$1.702e-02$	$2.519e-07$	2.0	$2.529e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.703e-04$			$1.703e-04$		
20	$5.00e-02$	$4.257e-05$	2.0	$1.704e-02$	$4.257e-05$	2.0	$1.704e-02$
40	$2.50e-02$	$1.064e-05$	2.0	$1.703e-02$	$1.064e-05$	2.0	$1.703e-02$
80	$1.25e-02$	$2.660e-06$	2.0	$1.703e-02$	$2.660e-06$	2.0	$1.703e-02$
160	$6.25e-03$	$6.651e-07$	2.0	$1.703e-02$	$6.651e-07$	2.0	$1.703e-02$
320	$3.13e-03$	$1.663e-07$	2.0	$1.702e-02$	$1.663e-07$	2.0	$1.702e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.706e-04$			$2.041e-04$		
20	$5.00e-02$	$4.273e-05$	2.0	$1.696e-02$	$4.989e-05$	2.0	$2.199e-02$
40	$2.50e-02$	$1.069e-05$	2.0	$1.706e-02$	$1.231e-05$	2.0	$2.115e-02$
80	$1.25e-02$	$2.672e-06$	2.0	$1.709e-02$	$3.054e-06$	2.0	$2.048e-02$
160	$6.25e-03$	$6.680e-07$	2.0	$1.710e-02$	$7.605e-07$	2.0	$2.003e-02$
320	$3.13e-03$	$1.670e-07$	2.0	$1.710e-02$	$1.898e-07$	2.0	$1.975e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.706e-04$			$1.938e-04$		
20	$5.00e-02$	$4.273e-05$	2.0	$1.696e-02$	$4.847e-05$	2.0	$1.934e-02$
40	$2.50e-02$	$1.069e-05$	2.0	$1.706e-02$	$1.212e-05$	2.0	$1.938e-02$
80	$1.25e-02$	$2.672e-06$	2.0	$1.709e-02$	$3.030e-06$	2.0	$1.939e-02$
160	$6.25e-03$	$6.680e-07$	2.0	$1.710e-02$	$7.575e-07$	2.0	$1.939e-02$
320	$3.13e-03$	$1.670e-07$	2.0	$1.710e-02$	$1.894e-07$	2.0	$1.939e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.439e-05$			$3.575e-05$		
20	$5.00e-02$	$1.835e-06$	3.0	$1.346e-02$	$4.634e-06$	2.9	$3.168e-02$
40	$2.50e-02$	$2.315e-07$	3.0	$1.410e-02$	$5.900e-07$	3.0	$3.426e-02$
80	$1.25e-02$	$2.907e-08$	3.0	$1.447e-02$	$7.442e-08$	3.0	$3.596e-02$
160	$6.25e-03$	$3.642e-09$	3.0	$1.468e-02$	$9.345e-09$	3.0	$3.702e-02$
320	$3.13e-03$	$4.559e-10$	3.0	$1.478e-02$	$1.171e-09$	3.0	$3.762e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.439e-05$			$2.262e-05$		
20	$5.00e-02$	$1.835e-06$	3.0	$1.346e-02$	$2.846e-06$	3.0	$2.215e-02$
40	$2.50e-02$	$2.315e-07$	3.0	$1.410e-02$	$3.565e-07$	3.0	$2.256e-02$
80	$1.25e-02$	$2.907e-08$	3.0	$1.447e-02$	$4.460e-08$	3.0	$2.272e-02$
160	$6.25e-03$	$3.642e-09$	3.0	$1.468e-02$	$5.577e-09$	3.0	$2.277e-02$
320	$3.13e-03$	$4.559e-10$	3.0	$1.478e-02$	$6.973e-10$	3.0	$2.280e-02$

Table 48: Numerical experiment `ewa0412` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.819e-07$			$5.819e-07$		
20	$5.00e-02$	$3.637e-08$	4.0	$5.815e-03$	$3.637e-08$	4.0	$5.815e-03$
40	$2.50e-02$	$2.273e-09$	4.0	$5.818e-03$	$2.273e-09$	4.0	$5.818e-03$
80	$1.25e-02$	$1.443e-10$	4.0	$5.362e-03$	$1.443e-10$	4.0	$5.362e-03$
160	$6.25e-03$	$8.706e-12$	4.1	$7.391e-03$	$8.706e-12$	4.1	$7.391e-03$
320	$3.13e-03$	$4.451e-11$	-2.4	$5.634e-17$	$4.451e-11$	-2.4	$5.634e-17$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.889e-07$			$2.791e-07$		
20	$5.00e-02$	$1.192e-08$	4.0	$1.827e-03$	$1.747e-08$	4.0	$2.781e-03$
40	$2.50e-02$	$7.470e-10$	4.0	$1.888e-03$	$1.092e-09$	4.0	$2.791e-03$
80	$1.25e-02$	$4.708e-11$	4.0	$1.828e-03$	$6.856e-11$	4.0	$2.729e-03$
160	$6.25e-03$	$6.514e-12$	2.9	$1.268e-05$	$6.514e-12$	3.4	$1.987e-04$
320	$3.13e-03$	$2.114e-11$	-1.7	$1.179e-15$	$2.114e-11$	-1.7	$1.179e-15$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.708e-07$			$2.708e-07$		
20	$5.00e-02$	$1.691e-08$	4.0	$2.715e-03$	$1.691e-08$	4.0	$2.715e-03$
40	$2.50e-02$	$1.057e-09$	4.0	$2.711e-03$	$1.057e-09$	4.0	$2.711e-03$
80	$1.25e-02$	$6.555e-11$	4.0	$2.813e-03$	$6.555e-11$	4.0	$2.813e-03$
160	$6.25e-03$	$1.560e-11$	2.1	$5.733e-07$	$1.560e-11$	2.1	$5.733e-07$
320	$3.13e-03$	$4.441e-12$	1.8	$1.541e-07$	$4.441e-12$	1.8	$1.541e-07$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.126e-08$			$7.263e-08$		
20	$5.00e-02$	$3.872e-09$	4.0	$5.905e-04$	$4.545e-09$	4.0	$7.234e-04$
40	$2.50e-02$	$2.424e-10$	4.0	$6.152e-04$	$2.839e-10$	4.0	$7.287e-04$
80	$1.25e-02$	$1.455e-11$	4.1	$7.680e-04$	$1.729e-11$	4.0	$8.360e-04$
160	$6.25e-03$	$7.231e-12$	1.0	$1.211e-09$	$7.231e-12$	1.3	$4.271e-09$
320	$3.13e-03$	$7.757e-13$	3.2	$9.077e-05$	$7.757e-13$	3.2	$9.077e-05$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.654e-09$			$1.091e-07$		
20	$5.00e-02$	$1.165e-10$	5.0	$3.419e-04$	$6.942e-09$	4.0	$1.029e-03$
40	$2.50e-02$	$3.659e-12$	5.0	$3.647e-04$	$4.376e-10$	4.0	$1.070e-03$
80	$1.25e-02$	$1.163e-13$	5.0	$3.421e-04$	$2.757e-11$	4.0	$1.073e-03$
160	$6.25e-03$	$1.817e-13$	-0.6	$6.928e-15$	$1.864e-12$	3.9	$6.870e-04$
320	$3.13e-03$	$4.926e-13$	-1.4	$1.226e-16$	$4.926e-13$	1.9	$3.182e-08$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.654e-09$			$1.091e-07$		
20	$5.00e-02$	$1.165e-10$	5.0	$3.419e-04$	$6.942e-09$	4.0	$1.029e-03$
40	$2.50e-02$	$3.659e-12$	5.0	$3.646e-04$	$4.376e-10$	4.0	$1.070e-03$
80	$1.25e-02$	$3.397e-14$	6.8	$2.393e-01$	$2.755e-11$	4.0	$1.078e-03$
160	$6.25e-03$	$5.040e-14$	-0.6	$2.805e-15$	$1.774e-12$	4.0	$9.329e-04$
320	$3.13e-03$	$1.654e-13$	-1.7	$8.383e-18$	$2.731e-13$	2.7	$1.584e-06$

Table 49: Numerical experiment `ewa0412` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.472e-08$			$2.083e-08$		
20	$5.00e-02$	$9.204e-10$	4.0	$1.468e-04$	$1.350e-09$	3.9	$1.849e-04$
40	$2.50e-02$	$5.766e-11$	4.0	$1.458e-04$	$8.609e-11$	4.0	$1.977e-04$
80	$1.25e-02$	$3.082e-12$	4.2	$3.395e-04$	$3.082e-12$	4.8	$4.280e-03$
160	$6.25e-03$	$1.989e-11$	-2.7	$2.339e-17$	$1.989e-11$	-2.7	$2.339e-17$
320	$3.13e-03$	$6.954e-11$	-1.8	$2.081e-15$	$7.325e-11$	-1.9	$1.422e-15$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.472e-08$			$1.472e-08$		
20	$5.00e-02$	$9.204e-10$	4.0	$1.468e-04$	$9.204e-10$	4.0	$1.468e-04$
40	$2.50e-02$	$5.766e-11$	4.0	$1.458e-04$	$5.766e-11$	4.0	$1.458e-04$
80	$1.25e-02$	$1.154e-12$	5.6	$6.319e-02$	$1.154e-12$	5.6	$6.319e-02$
160	$6.25e-03$	$1.683e-11$	-3.9	$5.063e-20$	$1.850e-11$	-4.0	$2.787e-20$
320	$3.13e-03$	$5.859e-11$	-1.8	$1.820e-15$	$7.208e-11$	-2.0	$8.760e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.332e-09$			$8.668e-09$		
20	$5.00e-02$	$4.583e-10$	4.0	$7.328e-05$	$5.312e-10$	4.0	$9.253e-05$
40	$2.50e-02$	$2.936e-11$	4.0	$6.590e-05$	$3.370e-11$	4.0	$7.968e-05$
80	$1.25e-02$	$4.565e-12$	2.7	$5.883e-07$	$5.669e-12$	2.6	$4.444e-07$
160	$6.25e-03$	$3.300e-12$	0.5	$3.550e-11$	$3.300e-12$	0.8	$1.732e-10$
320	$3.13e-03$	$9.590e-12$	-1.5	$1.338e-15$	$1.024e-11$	-1.6	$8.252e-16$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.332e-09$			$8.321e-09$		
20	$5.00e-02$	$4.583e-10$	4.0	$7.328e-05$	$5.198e-10$	4.0	$8.334e-05$
40	$2.50e-02$	$2.936e-11$	4.0	$6.590e-05$	$3.335e-11$	4.0	$7.429e-05$
80	$1.25e-02$	$4.496e-12$	2.7	$6.384e-07$	$5.499e-12$	2.6	$4.890e-07$
160	$6.25e-03$	$3.552e-13$	3.7	$4.186e-05$	$3.552e-13$	4.0	$1.830e-04$
320	$3.13e-03$	$7.541e-12$	-4.4	$6.824e-23$	$9.744e-12$	-4.8	$1.045e-23$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.278e-13$			$6.634e-10$		
20	$5.00e-02$	$1.788e-13$	2.4	$2.201e-10$	$2.201e-11$	4.9	$5.441e-05$
40	$2.50e-02$	$3.101e-13$	-0.8	$1.658e-14$	$6.994e-13$	5.0	$6.547e-05$
80	$1.25e-02$	$6.718e-13$	-1.1	$5.063e-15$	$6.718e-13$	0.1	$8.665e-13$
160	$6.25e-03$	$1.262e-12$	-0.9	$1.249e-14$	$1.286e-12$	-0.9	$1.110e-14$
320	$3.13e-03$	$2.332e-12$	-0.9	$1.407e-14$	$2.424e-12$	-0.9	$1.237e-14$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.277e-13$			$3.908e-10$		
20	$5.00e-02$	$1.641e-13$	2.5	$2.928e-10$	$1.243e-11$	5.0	$3.680e-05$
40	$2.50e-02$	$3.018e-13$	-0.9	$1.179e-14$	$3.906e-13$	5.0	$3.891e-05$
80	$1.25e-02$	$5.280e-13$	-0.8	$1.536e-14$	$5.287e-13$	-0.4	$7.797e-14$
160	$6.25e-03$	$1.092e-12$	-1.0	$5.354e-15$	$1.092e-12$	-1.0	$5.394e-15$
320	$3.13e-03$	$2.018e-12$	-0.9	$1.212e-14$	$2.019e-12$	-0.9	$1.213e-14$

Table 50: Numerical experiment `ewa0412` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.143e-11$			$3.143e-11$		
20	$5.00e-02$	$4.266e-12$	2.9	$2.392e-08$	$4.266e-12$	2.9	$2.392e-08$
40	$2.50e-02$	$7.606e-12$	-0.8	$3.504e-13$	$7.606e-12$	-0.8	$3.504e-13$
80	$1.25e-02$	$1.934e-11$	-1.3	$5.297e-14$	$1.934e-11$	-1.3	$5.297e-14$
160	$6.25e-03$	$4.142e-11$	-1.1	$1.568e-13$	$4.142e-11$	-1.1	$1.568e-13$
320	$3.13e-03$	$1.536e-10$	-1.9	$2.817e-15$	$1.536e-10$	-1.9	$2.817e-15$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.025e-11$			$1.422e-11$		
20	$5.00e-02$	$2.686e-12$	1.9	$8.766e-10$	$2.686e-12$	2.4	$3.607e-09$
40	$2.50e-02$	$3.633e-12$	-0.4	$7.275e-13$	$3.633e-12$	-0.4	$7.275e-13$
80	$1.25e-02$	$9.833e-12$	-1.4	$1.816e-14$	$9.833e-12$	-1.4	$1.816e-14$
160	$6.25e-03$	$1.200e-11$	-0.3	$2.796e-12$	$1.200e-11$	-0.3	$2.796e-12$
320	$3.13e-03$	$5.380e-11$	-2.2	$2.029e-16$	$5.380e-11$	-2.2	$2.029e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.180e-12$			$7.180e-12$		
20	$5.00e-02$	$1.737e-13$	5.4	$1.678e-06$	$1.737e-13$	5.4	$1.678e-06$
40	$2.50e-02$	$5.431e-13$	-1.6	$1.261e-15$	$5.431e-13$	-1.6	$1.261e-15$
80	$1.25e-02$	$5.752e-12$	-3.4	$1.906e-18$	$5.752e-12$	-3.4	$1.906e-18$
160	$6.25e-03$	$1.371e-11$	-1.3	$2.377e-14$	$1.371e-11$	-1.3	$2.377e-14$
320	$3.13e-03$	$1.993e-11$	-0.5	$8.851e-13$	$1.993e-11$	-0.5	$8.851e-13$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.608e-12$			$1.841e-12$		
20	$5.00e-02$	$5.707e-14$	4.8	$1.055e-07$	$6.217e-14$	4.9	$1.424e-07$
40	$2.50e-02$	$1.665e-13$	-1.5	$5.573e-16$	$1.665e-13$	-1.4	$8.795e-16$
80	$1.25e-02$	$3.220e-12$	-4.3	$2.375e-20$	$3.220e-12$	-4.3	$2.375e-20$
160	$6.25e-03$	$7.318e-12$	-1.2	$1.794e-14$	$7.318e-12$	-1.2	$1.794e-14$
320	$3.13e-03$	$4.544e-12$	0.7	$2.396e-10$	$4.544e-12$	0.7	$2.396e-10$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0412	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.330e-13$			$2.603e-12$		
20	$5.00e-02$	$1.218e-12$	-0.9	$7.206e-14$	$1.245e-12$	1.1	$3.020e-11$
40	$2.50e-02$	$2.446e-12$	-1.0	$5.974e-14$	$2.446e-12$	-1.0	$6.717e-14$
80	$1.25e-02$	$4.753e-12$	-1.0	$7.125e-14$	$4.793e-12$	-1.0	$6.815e-14$
160	$6.25e-03$	$9.708e-12$	-1.0	$5.201e-14$	$9.718e-12$	-1.0	$5.496e-14$
320	$3.13e-03$	$1.973e-11$	-1.0	$5.401e-14$	$1.973e-11$	-1.0	$5.444e-14$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.326e-13$			$2.607e-12$		
20	$5.00e-02$	$1.217e-12$	-0.9	$7.188e-14$	$1.287e-12$	1.0	$2.723e-11$
40	$2.50e-02$	$2.446e-12$	-1.0	$5.974e-14$	$2.515e-12$	-1.0	$7.100e-14$
80	$1.25e-02$	$4.753e-12$	-1.0	$7.123e-14$	$4.823e-12$	-0.9	$7.861e-14$
160	$6.25e-03$	$9.622e-12$	-1.0	$5.502e-14$	$9.692e-12$	-1.0	$5.851e-14$
320	$3.13e-03$	$1.938e-11$	-1.0	$5.702e-14$	$1.946e-11$	-1.0	$5.900e-14$

Table 51: Numerical experiment `ewa0412` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.557e-03$			$6.557e-03$		
20	$5.00e-02$	$1.681e-03$	2.0	$6.035e-01$	$1.681e-03$	2.0	$6.035e-01$
40	$2.50e-02$	$4.255e-04$	2.0	$6.366e-01$	$4.255e-04$	2.0	$6.366e-01$
80	$1.25e-02$	$1.071e-04$	2.0	$6.583e-01$	$1.071e-04$	2.0	$6.583e-01$
160	$6.25e-03$	$2.685e-05$	2.0	$6.716e-01$	$2.685e-05$	2.0	$6.716e-01$
320	$3.13e-03$	$6.723e-06$	2.0	$6.794e-01$	$6.723e-06$	2.0	$6.794e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.555e-03$			$3.555e-03$		
20	$5.00e-02$	$8.860e-04$	2.0	$3.592e-01$	$8.860e-04$	2.0	$3.592e-01$
40	$2.50e-02$	$2.213e-04$	2.0	$3.556e-01$	$2.213e-04$	2.0	$3.556e-01$
80	$1.25e-02$	$5.532e-05$	2.0	$3.545e-01$	$5.532e-05$	2.0	$3.545e-01$
160	$6.25e-03$	$1.383e-05$	2.0	$3.542e-01$	$1.383e-05$	2.0	$3.542e-01$
320	$3.13e-03$	$3.457e-06$	2.0	$3.541e-01$	$3.457e-06$	2.0	$3.541e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	1	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.278e-02$			$4.278e-02$		
20	$5.00e-02$	$2.211e-02$	1.0	$3.835e-01$	$2.211e-02$	1.0	$3.835e-01$
40	$2.50e-02$	$1.123e-02$	1.0	$4.120e-01$	$1.123e-02$	1.0	$4.120e-01$
80	$1.25e-02$	$5.663e-03$	1.0	$4.303e-01$	$5.663e-03$	1.0	$4.303e-01$
160	$6.25e-03$	$2.843e-03$	1.0	$4.416e-01$	$2.843e-03$	1.0	$4.416e-01$
320	$3.13e-03$	$1.424e-03$	1.0	$4.482e-01$	$1.424e-03$	1.0	$4.482e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.278e-02$			$4.278e-02$		
20	$5.00e-02$	$2.211e-02$	1.0	$3.835e-01$	$2.211e-02$	1.0	$3.835e-01$
40	$2.50e-02$	$1.123e-02$	1.0	$4.120e-01$	$1.123e-02$	1.0	$4.120e-01$
80	$1.25e-02$	$5.663e-03$	1.0	$4.303e-01$	$5.663e-03$	1.0	$4.303e-01$
160	$6.25e-03$	$2.843e-03$	1.0	$4.416e-01$	$2.843e-03$	1.0	$4.416e-01$
320	$3.13e-03$	$1.424e-03$	1.0	$4.482e-01$	$1.424e-03$	1.0	$4.482e-01$

Table 52: Numerical experiment `ewa0413` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.050e-03$			$1.050e-03$		
20	$5.00e-02$	$2.623e-04$	2.0	$1.053e-01$	$2.623e-04$	2.0	$1.053e-01$
40	$2.50e-02$	$6.557e-05$	2.0	$1.050e-01$	$6.557e-05$	2.0	$1.050e-01$
80	$1.25e-02$	$1.639e-05$	2.0	$1.049e-01$	$1.639e-05$	2.0	$1.049e-01$
160	$6.25e-03$	$4.098e-06$	2.0	$1.049e-01$	$4.098e-06$	2.0	$1.049e-01$
320	$3.13e-03$	$1.024e-06$	2.0	$1.049e-01$	$1.024e-06$	2.0	$1.049e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.050e-03$			$1.050e-03$		
20	$5.00e-02$	$2.623e-04$	2.0	$1.053e-01$	$2.623e-04$	2.0	$1.053e-01$
40	$2.50e-02$	$6.557e-05$	2.0	$1.050e-01$	$6.557e-05$	2.0	$1.050e-01$
80	$1.25e-02$	$1.639e-05$	2.0	$1.049e-01$	$1.639e-05$	2.0	$1.049e-01$
160	$6.25e-03$	$4.098e-06$	2.0	$1.049e-01$	$4.098e-06$	2.0	$1.049e-01$
320	$3.13e-03$	$1.024e-06$	2.0	$1.049e-01$	$1.024e-06$	2.0	$1.049e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.875e-04$			$7.875e-04$		
20	$5.00e-02$	$1.967e-04$	2.0	$7.895e-02$	$1.967e-04$	2.0	$7.895e-02$
40	$2.50e-02$	$4.917e-05$	2.0	$7.876e-02$	$4.917e-05$	2.0	$7.876e-02$
80	$1.25e-02$	$1.229e-05$	2.0	$7.870e-02$	$1.229e-05$	2.0	$7.870e-02$
160	$6.25e-03$	$3.073e-06$	2.0	$7.868e-02$	$3.073e-06$	2.0	$7.868e-02$
320	$3.13e-03$	$7.683e-07$	2.0	$7.868e-02$	$7.683e-07$	2.0	$7.868e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.875e-04$			$7.875e-04$		
20	$5.00e-02$	$1.967e-04$	2.0	$7.895e-02$	$1.967e-04$	2.0	$7.895e-02$
40	$2.50e-02$	$4.917e-05$	2.0	$7.876e-02$	$4.917e-05$	2.0	$7.876e-02$
80	$1.25e-02$	$1.229e-05$	2.0	$7.870e-02$	$1.229e-05$	2.0	$7.870e-02$
160	$6.25e-03$	$3.073e-06$	2.0	$7.868e-02$	$3.073e-06$	2.0	$7.868e-02$
320	$3.13e-03$	$7.683e-07$	2.0	$7.868e-02$	$7.683e-07$	2.0	$7.868e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	2	Radau	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.066e-05$			$1.642e-04$		
20	$5.00e-02$	$9.036e-06$	3.0	$6.550e-02$	$2.087e-05$	3.0	$1.554e-01$
40	$2.50e-02$	$1.142e-06$	3.0	$6.887e-02$	$2.629e-06$	3.0	$1.612e-01$
80	$1.25e-02$	$1.436e-07$	3.0	$7.097e-02$	$3.301e-07$	3.0	$1.646e-01$
160	$6.25e-03$	$1.800e-08$	3.0	$7.223e-02$	$4.134e-08$	3.0	$1.668e-01$
320	$3.13e-03$	$2.253e-09$	3.0	$7.297e-02$	$5.173e-09$	3.0	$1.681e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.066e-05$			$1.275e-04$		
20	$5.00e-02$	$9.036e-06$	3.0	$6.550e-02$	$1.604e-05$	3.0	$1.245e-01$
40	$2.50e-02$	$1.142e-06$	3.0	$6.887e-02$	$2.012e-06$	3.0	$1.266e-01$
80	$1.25e-02$	$1.436e-07$	3.0	$7.097e-02$	$2.519e-07$	3.0	$1.277e-01$
160	$6.25e-03$	$1.800e-08$	3.0	$7.223e-02$	$3.151e-08$	3.0	$1.284e-01$
320	$3.13e-03$	$2.253e-09$	3.0	$7.297e-02$	$3.940e-09$	3.0	$1.287e-01$

Table 53: Numerical experiment `ewa0413` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.108e-06$			$3.108e-06$		
20	$5.00e-02$	$1.950e-07$	4.0	$3.066e-02$	$1.950e-07$	4.0	$3.066e-02$
40	$2.50e-02$	$1.220e-08$	4.0	$3.107e-02$	$1.220e-08$	4.0	$3.107e-02$
80	$1.25e-02$	$7.626e-10$	4.0	$3.125e-02$	$7.626e-10$	4.0	$3.125e-02$
160	$6.25e-03$	$4.842e-11$	4.0	$2.829e-02$	$4.842e-11$	4.0	$2.829e-02$
320	$3.13e-03$	$3.389e-11$	0.5	$6.598e-10$	$3.389e-11$	0.5	$6.598e-10$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.966e-06$			$2.966e-06$		
20	$5.00e-02$	$1.871e-07$	4.0	$2.873e-02$	$1.871e-07$	4.0	$2.873e-02$
40	$2.50e-02$	$1.172e-08$	4.0	$2.965e-02$	$1.172e-08$	4.0	$2.965e-02$
80	$1.25e-02$	$7.277e-10$	4.0	$3.113e-02$	$7.277e-10$	4.0	$3.113e-02$
160	$6.25e-03$	$4.635e-11$	4.0	$2.645e-02$	$4.635e-11$	4.0	$2.645e-02$
320	$3.13e-03$	$1.367e-11$	1.8	$3.540e-07$	$1.367e-11$	1.8	$3.540e-07$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.657e-06$			$1.657e-06$		
20	$5.00e-02$	$1.040e-07$	4.0	$1.635e-02$	$1.040e-07$	4.0	$1.635e-02$
40	$2.50e-02$	$6.508e-09$	4.0	$1.657e-02$	$6.508e-09$	4.0	$1.657e-02$
80	$1.25e-02$	$4.069e-10$	4.0	$1.663e-02$	$4.069e-10$	4.0	$1.663e-02$
160	$6.25e-03$	$2.533e-11$	4.0	$1.709e-02$	$2.533e-11$	4.0	$1.709e-02$
320	$3.13e-03$	$1.103e-11$	1.2	$1.112e-08$	$1.103e-11$	1.2	$1.112e-08$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.771e-06$			$1.771e-06$		
20	$5.00e-02$	$1.119e-07$	4.0	$1.712e-02$	$1.119e-07$	4.0	$1.712e-02$
40	$2.50e-02$	$7.010e-09$	4.0	$1.770e-02$	$7.010e-09$	4.0	$1.770e-02$
80	$1.25e-02$	$4.385e-10$	4.0	$1.785e-02$	$4.385e-10$	4.0	$1.785e-02$
160	$6.25e-03$	$2.555e-11$	4.1	$2.800e-02$	$2.555e-11$	4.1	$2.800e-02$
320	$3.13e-03$	$4.579e-12$	2.5	$7.479e-06$	$5.684e-12$	2.2	$1.537e-06$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.211e-08$			$9.054e-07$		
20	$5.00e-02$	$3.858e-10$	5.0	$1.137e-03$	$5.662e-08$	4.0	$9.038e-03$
40	$2.50e-02$	$1.216e-11$	5.0	$1.189e-03$	$3.536e-09$	4.0	$9.091e-03$
80	$1.25e-02$	$4.650e-13$	4.7	$4.259e-04$	$2.209e-10$	4.0	$9.064e-03$
160	$6.25e-03$	$2.458e-13$	0.9	$2.615e-11$	$1.393e-11$	4.0	$8.546e-03$
320	$3.13e-03$	$4.403e-13$	-0.8	$3.442e-15$	$1.227e-12$	3.5	$7.401e-04$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.027e-08$			$9.053e-07$		
20	$5.00e-02$	$3.268e-10$	5.0	$9.660e-04$	$5.662e-08$	4.0	$9.034e-03$
40	$2.50e-02$	$1.029e-11$	5.0	$1.014e-03$	$3.536e-09$	4.0	$9.089e-03$
80	$1.25e-02$	$3.432e-13$	4.9	$7.432e-04$	$2.209e-10$	4.0	$9.073e-03$
160	$6.25e-03$	$1.124e-13$	1.6	$3.991e-10$	$1.390e-11$	4.0	$8.654e-03$
320	$3.13e-03$	$1.750e-13$	-0.6	$4.386e-15$	$1.037e-12$	3.7	$2.491e-03$

Table 54: Numerical experiment `ewa0413` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.630e-07$			$3.630e-07$		
20	$5.00e-02$	$2.267e-08$	4.0	$3.642e-03$	$2.267e-08$	4.0	$3.642e-03$
40	$2.50e-02$	$1.416e-09$	4.0	$3.638e-03$	$1.416e-09$	4.0	$3.638e-03$
80	$1.25e-02$	$9.508e-11$	3.9	$2.471e-03$	$9.508e-11$	3.9	$2.471e-03$
160	$6.25e-03$	$1.547e-11$	2.6	$9.202e-06$	$1.547e-11$	2.6	$9.202e-06$
320	$3.13e-03$	$2.210e-11$	-0.5	$1.135e-12$	$2.210e-11$	-0.5	$1.135e-12$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.630e-07$			$3.630e-07$		
20	$5.00e-02$	$2.267e-08$	4.0	$3.642e-03$	$2.267e-08$	4.0	$3.642e-03$
40	$2.50e-02$	$1.416e-09$	4.0	$3.638e-03$	$1.416e-09$	4.0	$3.638e-03$
80	$1.25e-02$	$9.508e-11$	3.9	$2.471e-03$	$9.508e-11$	3.9	$2.471e-03$
160	$6.25e-03$	$1.041e-11$	3.2	$1.124e-04$	$1.041e-11$	3.2	$1.124e-04$
320	$3.13e-03$	$5.740e-12$	0.9	$8.141e-10$	$5.740e-12$	0.9	$8.141e-10$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.645e-07$			$1.645e-07$		
20	$5.00e-02$	$1.027e-08$	4.0	$1.652e-03$	$1.027e-08$	4.0	$1.652e-03$
40	$2.50e-02$	$6.414e-10$	4.0	$1.645e-03$	$6.414e-10$	4.0	$1.645e-03$
80	$1.25e-02$	$3.874e-11$	4.0	$1.969e-03$	$3.874e-11$	4.0	$1.969e-03$
160	$6.25e-03$	$5.103e-12$	2.9	$1.424e-05$	$5.103e-12$	2.9	$1.424e-05$
320	$3.13e-03$	$1.361e-11$	-1.4	$3.869e-15$	$1.361e-11$	-1.4	$3.869e-15$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.645e-07$			$1.645e-07$		
20	$5.00e-02$	$1.027e-08$	4.0	$1.652e-03$	$1.027e-08$	4.0	$1.652e-03$
40	$2.50e-02$	$6.414e-10$	4.0	$1.645e-03$	$6.414e-10$	4.0	$1.645e-03$
80	$1.25e-02$	$3.847e-11$	4.1	$2.044e-03$	$3.847e-11$	4.1	$2.044e-03$
160	$6.25e-03$	$3.320e-12$	3.5	$2.050e-04$	$3.320e-12$	3.5	$2.050e-04$
320	$3.13e-03$	$9.547e-12$	-1.5	$1.452e-15$	$1.207e-11$	-1.9	$2.610e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.560e-11$			$1.228e-08$		
20	$5.00e-02$	$2.438e-13$	6.0	$1.558e-05$	$3.945e-10$	5.0	$1.120e-03$
40	$2.50e-02$	$2.776e-13$	-0.2	$1.392e-13$	$1.248e-11$	5.0	$1.197e-03$
80	$1.25e-02$	$4.428e-13$	-0.7	$2.312e-14$	$5.251e-13$	4.6	$2.621e-04$
160	$6.25e-03$	$1.086e-12$	-1.3	$1.519e-15$	$1.086e-12$	-1.0	$5.299e-15$
320	$3.13e-03$	$2.122e-12$	-1.0	$8.076e-15$	$2.122e-12$	-1.0	$8.076e-15$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.560e-11$			$7.656e-09$		
20	$5.00e-02$	$2.440e-13$	6.0	$1.553e-05$	$2.403e-10$	5.0	$7.543e-04$
40	$2.50e-02$	$2.534e-13$	-0.1	$2.075e-13$	$7.475e-12$	5.0	$7.846e-04$
80	$1.25e-02$	$4.430e-13$	-0.8	$1.295e-14$	$4.460e-13$	4.1	$2.451e-05$
160	$6.25e-03$	$8.902e-13$	-1.0	$5.373e-15$	$8.906e-13$	-1.0	$5.628e-15$
320	$3.13e-03$	$1.862e-12$	-1.1	$4.002e-15$	$1.863e-12$	-1.1	$4.012e-15$

Table 55: Numerical experiment `ewa0413` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.824e-10$			$6.824e-10$		
20	$5.00e-02$	$1.143e-11$	5.9	$5.423e-04$	$1.143e-11$	5.9	$5.423e-04$
40	$2.50e-02$	$2.151e-12$	2.4	$1.558e-08$	$2.151e-12$	2.4	$1.558e-08$
80	$1.25e-02$	$1.766e-11$	-3.0	$2.927e-17$	$1.766e-11$	-3.0	$2.927e-17$
160	$6.25e-03$	$7.705e-11$	-2.1	$1.594e-15$	$7.705e-11$	-2.1	$1.594e-15$
320	$3.13e-03$	$2.707e-10$	-1.8	$7.774e-15$	$2.707e-10$	-1.8	$7.774e-15$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.207e-10$			$8.207e-10$		
20	$5.00e-02$	$1.198e-11$	6.1	$1.030e-03$	$1.198e-11$	6.1	$1.030e-03$
40	$2.50e-02$	$4.417e-13$	4.8	$1.872e-05$	$4.417e-13$	4.8	$1.872e-05$
80	$1.25e-02$	$1.015e-11$	-4.5	$2.514e-20$	$1.015e-11$	-4.5	$2.514e-20$
160	$6.25e-03$	$4.160e-11$	-2.0	$1.360e-15$	$4.160e-11$	-2.0	$1.360e-15$
320	$3.13e-03$	$1.240e-10$	-1.6	$1.401e-14$	$1.240e-10$	-1.6	$1.401e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.754e-10$			$1.754e-10$		
20	$5.00e-02$	$2.738e-12$	6.0	$1.760e-04$	$2.738e-12$	6.0	$1.760e-04$
40	$2.50e-02$	$1.788e-12$	0.6	$1.727e-11$	$1.788e-12$	0.6	$1.727e-11$
80	$1.25e-02$	$1.150e-12$	0.6	$1.868e-11$	$1.150e-12$	0.6	$1.868e-11$
160	$6.25e-03$	$6.965e-12$	-2.6	$1.309e-17$	$6.965e-12$	-2.6	$1.309e-17$
320	$3.13e-03$	$9.721e-12$	-0.5	$6.061e-13$	$9.721e-12$	-0.5	$6.061e-13$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.226e-10$			$2.226e-10$		
20	$5.00e-02$	$3.285e-12$	6.1	$2.689e-04$	$3.285e-12$	6.1	$2.689e-04$
40	$2.50e-02$	$1.142e-12$	1.5	$3.160e-10$	$1.142e-12$	1.5	$3.160e-10$
80	$1.25e-02$	$6.245e-13$	0.9	$2.839e-11$	$6.245e-13$	0.9	$2.839e-11$
160	$6.25e-03$	$3.424e-12$	-2.5	$1.330e-17$	$3.424e-12$	-2.5	$1.330e-17$
320	$3.13e-03$	$2.630e-12$	0.4	$2.361e-11$	$2.630e-12$	0.4	$2.361e-11$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa0413	...	3	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.502e-13$			$6.345e-11$		
20	$5.00e-02$	$1.039e-12$	-0.9	$6.656e-14$	$2.023e-12$	5.0	$5.935e-06$
40	$2.50e-02$	$2.070e-12$	-1.0	$5.283e-14$	$2.315e-12$	-0.2	$1.130e-12$
80	$1.25e-02$	$4.052e-12$	-1.0	$5.806e-14$	$4.168e-12$	-0.8	$1.013e-13$
160	$6.25e-03$	$8.495e-12$	-1.1	$3.764e-14$	$8.755e-12$	-1.1	$3.818e-14$
320	$3.13e-03$	$1.652e-11$	-1.0	$6.515e-14$	$1.678e-11$	-0.9	$7.472e-14$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.507e-13$			$6.343e-11$		
20	$5.00e-02$	$1.040e-12$	-0.9	$6.670e-14$	$2.028e-12$	5.0	$5.878e-06$
40	$2.50e-02$	$2.071e-12$	-1.0	$5.293e-14$	$2.140e-12$	-0.1	$1.607e-12$
80	$1.25e-02$	$4.053e-12$	-1.0	$5.808e-14$	$4.123e-12$	-0.9	$6.529e-14$
160	$6.25e-03$	$8.237e-12$	-1.0	$4.573e-14$	$8.308e-12$	-1.0	$4.915e-14$
320	$3.13e-03$	$1.610e-11$	-1.0	$6.096e-14$	$1.617e-11$	-1.0	$6.342e-14$

Table 56: Numerical experiment `ewa0413` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.399e-01$			$4.399e-01$		
20	$5.00e-02$	$1.252e-01$	1.8	$2.856e+01$	$1.252e-01$	1.8	$2.856e+01$
40	$2.50e-02$	$3.351e-02$	1.9	$3.733e+01$	$3.351e-02$	1.9	$3.733e+01$
80	$1.25e-02$	$8.676e-03$	1.9	$4.454e+01$	$8.676e-03$	1.9	$4.454e+01$
160	$6.25e-03$	$2.207e-03$	2.0	$4.966e+01$	$2.207e-03$	2.0	$4.966e+01$
320	$3.13e-03$	$1.287e-03$	0.8	$1.150e-01$	$1.287e-03$	0.8	$1.150e-01$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.489e-03$			$2.489e-03$		
20	$5.00e-02$	$6.243e-04$	2.0	$2.460e-01$	$6.243e-04$	2.0	$2.460e-01$
40	$2.50e-02$	$1.562e-04$	2.0	$2.488e-01$	$1.562e-04$	2.0	$2.488e-01$
80	$1.25e-02$	$3.906e-05$	2.0	$2.496e-01$	$3.906e-05$	2.0	$2.496e-01$
160	$6.25e-03$	$9.765e-06$	2.0	$2.499e-01$	$9.765e-06$	2.0	$2.499e-01$
320	$3.13e-03$	$2.441e-06$	2.0	$2.500e-01$	$2.441e-06$	2.0	$2.500e-01$

Table 57: Numerical experiment `ewa111` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.098e-02$			$8.098e-02$		
20	$5.00e-02$	$2.042e-02$	2.0	$7.871e+00$	$2.042e-02$	2.0	$7.871e+00$
40	$2.50e-02$	$5.116e-03$	2.0	$8.092e+00$	$5.116e-03$	2.0	$8.092e+00$
80	$1.25e-02$	$1.280e-03$	2.0	$8.162e+00$	$1.280e-03$	2.0	$8.162e+00$
160	$6.25e-03$	$3.199e-04$	2.0	$8.183e+00$	$3.199e-04$	2.0	$8.183e+00$
320	$3.13e-03$	$7.998e-05$	2.0	$8.189e+00$	$7.998e-05$	2.0	$8.189e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.183e-04$			$3.183e-04$		
20	$5.00e-02$	$7.941e-05$	2.0	$3.205e-02$	$7.941e-05$	2.0	$3.205e-02$
40	$2.50e-02$	$1.984e-05$	2.0	$3.184e-02$	$1.984e-05$	2.0	$3.184e-02$
80	$1.25e-02$	$4.960e-06$	2.0	$3.177e-02$	$4.960e-06$	2.0	$3.177e-02$
160	$6.25e-03$	$1.240e-06$	2.0	$3.175e-02$	$1.240e-06$	2.0	$3.175e-02$
320	$3.13e-03$	$3.100e-07$	2.0	$3.174e-02$	$3.100e-07$	2.0	$3.174e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.080e-02$			$6.080e-02$		
20	$5.00e-02$	$1.532e-02$	2.0	$5.927e+00$	$1.532e-02$	2.0	$5.927e+00$
40	$2.50e-02$	$3.837e-03$	2.0	$6.077e+00$	$3.837e-03$	2.0	$6.077e+00$
80	$1.25e-02$	$9.597e-04$	2.0	$6.124e+00$	$9.597e-04$	2.0	$6.124e+00$
160	$6.25e-03$	$2.399e-04$	2.0	$6.138e+00$	$2.399e-04$	2.0	$6.138e+00$
320	$3.13e-03$	$5.999e-05$	2.0	$6.142e+00$	$5.999e-05$	2.0	$6.142e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.617e-07$			$2.458e-05$		
20	$5.00e-02$	$2.891e-08$	4.0	$4.584e-03$	$3.073e-06$	3.0	$2.458e-02$
40	$2.50e-02$	$1.808e-09$	4.0	$4.616e-03$	$3.840e-07$	3.0	$2.459e-02$
80	$1.25e-02$	$1.130e-10$	4.0	$4.626e-03$	$4.800e-08$	3.0	$2.459e-02$
160	$6.25e-03$	$7.064e-12$	4.0	$4.628e-03$	$6.000e-09$	3.0	$2.458e-02$
320	$3.13e-03$	$4.415e-13$	4.0	$4.628e-03$	$7.500e-10$	3.0	$2.458e-02$

Table 58: Numerical experiment `ewa111` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.444e-03$			$2.444e-03$		
20	$5.00e-02$	$1.868e-04$	3.7	$1.252e+01$	$1.868e-04$	3.7	$1.252e+01$
40	$2.50e-02$	$1.297e-05$	3.8	$1.897e+01$	$1.297e-05$	3.8	$1.897e+01$
80	$1.25e-02$	$8.556e-07$	3.9	$2.494e+01$	$8.556e-07$	3.9	$2.494e+01$
160	$6.25e-03$	$5.495e-08$	4.0	$2.950e+01$	$5.495e-08$	4.0	$2.950e+01$
320	$3.13e-03$	$3.480e-09$	4.0	$3.267e+01$	$3.480e-09$	4.0	$3.267e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.059e-07$			$6.059e-07$		
20	$5.00e-02$	$3.795e-08$	4.0	$6.017e-03$	$3.795e-08$	4.0	$6.017e-03$
40	$2.50e-02$	$2.373e-09$	4.0	$6.058e-03$	$2.373e-09$	4.0	$6.058e-03$
80	$1.25e-02$	$1.483e-10$	4.0	$6.071e-03$	$1.483e-10$	4.0	$6.071e-03$
160	$6.25e-03$	$9.272e-12$	4.0	$6.075e-03$	$9.272e-12$	4.0	$6.075e-03$
320	$3.13e-03$	$5.807e-13$	4.0	$5.981e-03$	$5.807e-13$	4.0	$5.981e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.306e-03$			$1.306e-03$		
20	$5.00e-02$	$9.968e-05$	3.7	$6.727e+00$	$9.968e-05$	3.7	$6.727e+00$
40	$2.50e-02$	$6.918e-06$	3.8	$1.014e+01$	$6.918e-06$	3.8	$1.014e+01$
80	$1.25e-02$	$4.562e-07$	3.9	$1.331e+01$	$4.562e-07$	3.9	$1.331e+01$
160	$6.25e-03$	$2.930e-08$	4.0	$1.573e+01$	$2.930e-08$	4.0	$1.573e+01$
320	$3.13e-03$	$1.857e-09$	4.0	$1.734e+01$	$1.857e-09$	4.0	$1.734e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.079e-11$			$2.600e-07$		
20	$5.00e-02$	$3.253e-13$	6.0	$2.067e-05$	$1.627e-08$	4.0	$2.590e-03$
40	$2.50e-02$	$1.843e-14$	4.1	$7.958e-08$	$1.017e-09$	4.0	$2.600e-03$
80	$1.25e-02$	$3.708e-14$	-1.0	$4.462e-16$	$6.358e-11$	4.0	$2.603e-03$
160	$6.25e-03$	$7.039e-14$	-0.9	$6.449e-16$	$3.974e-12$	4.0	$2.604e-03$
320	$3.13e-03$	$1.623e-13$	-1.2	$1.551e-16$	$2.483e-13$	4.0	$2.604e-03$

Table 59: Numerical experiment `ewa111` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.931e-04$			$2.931e-04$		
20	$5.00e-02$	$1.873e-05$	4.0	$2.720e+00$	$1.873e-05$	4.0	$2.720e+00$
40	$2.50e-02$	$1.178e-06$	4.0	$2.923e+00$	$1.178e-06$	4.0	$2.923e+00$
80	$1.25e-02$	$7.371e-08$	4.0	$2.990e+00$	$7.371e-08$	4.0	$2.990e+00$
160	$6.25e-03$	$4.616e-09$	4.0	$2.982e+00$	$4.616e-09$	4.0	$2.982e+00$
320	$3.13e-03$	$3.356e-10$	3.8	$9.994e-01$	$3.356e-10$	3.8	$9.994e-01$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.684e-08$			$3.684e-08$		
20	$5.00e-02$	$2.302e-09$	4.0	$3.685e-04$	$2.302e-09$	4.0	$3.685e-04$
40	$2.50e-02$	$1.439e-10$	4.0	$3.684e-04$	$1.439e-10$	4.0	$3.684e-04$
80	$1.25e-02$	$9.020e-12$	4.0	$3.627e-04$	$9.020e-12$	4.0	$3.627e-04$
160	$6.25e-03$	$6.144e-13$	3.9	$2.145e-04$	$6.144e-13$	3.9	$2.145e-04$
320	$3.13e-03$	$1.579e-13$	2.0	$1.286e-08$	$1.579e-13$	2.0	$1.286e-08$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.093e-04$			$1.093e-04$		
20	$5.00e-02$	$6.973e-06$	4.0	$1.021e+00$	$6.973e-06$	4.0	$1.021e+00$
40	$2.50e-02$	$4.381e-07$	4.0	$1.090e+00$	$4.381e-07$	4.0	$1.090e+00$
80	$1.25e-02$	$2.742e-08$	4.0	$1.114e+00$	$2.742e-08$	4.0	$1.114e+00$
160	$6.25e-03$	$1.716e-09$	4.0	$1.113e+00$	$1.716e-09$	4.0	$1.113e+00$
320	$3.13e-03$	$1.084e-10$	4.0	$1.040e+00$	$1.084e-10$	4.0	$1.040e+00$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.718e-16$			$1.142e-09$		
20	$5.00e-02$	$4.441e-16$	0.1	$5.771e-16$	$3.603e-11$	5.0	$1.105e-04$
40	$2.50e-02$	$8.882e-16$	-1.0	$2.220e-17$	$1.130e-12$	5.0	$1.135e-04$
80	$1.25e-02$	$7.105e-15$	-3.0	$1.388e-20$	$4.186e-14$	4.8	$4.679e-05$
160	$6.25e-03$	$5.329e-15$	0.4	$4.380e-14$	$6.439e-15$	2.7	$5.767e-09$
320	$3.13e-03$	$7.772e-15$	-0.5	$3.364e-16$	$7.772e-15$	-0.3	$1.625e-15$

Table 60: Numerical experiment `ewa111` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.058e-05$			$1.058e-05$		
20	$5.00e-02$	$2.189e-07$	5.6	$4.168e+00$	$2.189e-07$	5.6	$4.168e+00$
40	$2.50e-02$	$3.960e-09$	5.8	$7.435e+00$	$3.960e-09$	5.8	$7.435e+00$
80	$1.25e-02$	$6.507e-11$	5.9	$1.242e+01$	$6.507e-11$	5.9	$1.242e+01$
160	$6.25e-03$	$2.048e-11$	1.7	$9.724e-08$	$2.048e-11$	1.7	$9.724e-08$
320	$3.13e-03$	$4.167e-11$	-1.0	$1.126e-13$	$4.167e-11$	-1.0	$1.126e-13$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.384e-11$			$4.384e-11$		
20	$5.00e-02$	$6.859e-13$	6.0	$4.365e-05$	$6.859e-13$	6.0	$4.365e-05$
40	$2.50e-02$	$1.239e-14$	5.8	$2.345e-05$	$1.239e-14$	5.8	$2.345e-05$
80	$1.25e-02$	$1.243e-14$	-0.0	$1.216e-14$	$1.243e-14$	-0.0	$1.216e-14$
160	$6.25e-03$	$1.932e-14$	-0.6	$7.674e-16$	$1.932e-14$	-0.6	$7.674e-16$
320	$3.13e-03$	$3.697e-14$	-0.9	$1.667e-16$	$3.697e-14$	-0.9	$1.667e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa111	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.731e-06$			$2.731e-06$		
20	$5.00e-02$	$5.635e-08$	5.6	$1.085e+00$	$5.635e-08$	5.6	$1.085e+00$
40	$2.50e-02$	$1.019e-09$	5.8	$1.920e+00$	$1.019e-09$	5.8	$1.920e+00$
80	$1.25e-02$	$1.786e-11$	5.8	$2.259e+00$	$1.786e-11$	5.8	$2.259e+00$
160	$6.25e-03$	$3.052e-12$	2.5	$1.268e-06$	$3.052e-12$	2.5	$1.268e-06$
320	$3.13e-03$	$9.686e-12$	-1.7	$6.485e-16$	$9.686e-12$	-1.7	$6.485e-16$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.220e-15$			$7.222e-12$		
20	$5.00e-02$	$3.553e-15$	-0.1	$2.322e-15$	$1.130e-13$	6.0	$7.194e-06$
40	$2.50e-02$	$5.773e-15$	-0.7	$4.358e-16$	$5.995e-15$	4.2	$3.666e-08$
80	$1.25e-02$	$1.699e-14$	-1.6	$1.850e-17$	$1.699e-14$	-1.5	$2.348e-17$
160	$6.25e-03$	$3.975e-14$	-1.2	$7.872e-17$	$3.975e-14$	-1.2	$7.872e-17$
320	$3.13e-03$	$8.005e-14$	-1.0	$2.361e-16$	$8.005e-14$	-1.0	$2.361e-16$

Table 61: Numerical experiment `ewa111` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.824e-02$			$3.824e-02$		
20	$5.00e-02$	$1.738e-02$	1.1	$5.248e-01$	$1.738e-02$	1.1	$5.248e-01$
40	$2.50e-02$	$8.270e-03$	1.1	$4.308e-01$	$8.270e-03$	1.1	$4.308e-01$
80	$1.25e-02$	$4.031e-03$	1.0	$3.789e-01$	$4.031e-03$	1.0	$3.789e-01$
160	$6.25e-03$	$1.989e-03$	1.0	$3.500e-01$	$1.989e-03$	1.0	$3.500e-01$
320	$3.13e-03$	$9.882e-04$	1.0	$3.339e-01$	$9.882e-04$	1.0	$3.339e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.412e-04$			$8.018e-04$		
20	$5.00e-02$	$1.839e-04$	2.0	$7.607e-02$	$2.288e-04$	1.8	$5.170e-02$
40	$2.50e-02$	$4.587e-05$	2.0	$7.416e-02$	$6.126e-05$	1.9	$6.802e-02$
80	$1.25e-02$	$1.146e-05$	2.0	$7.352e-02$	$1.586e-05$	1.9	$8.133e-02$
160	$6.25e-03$	$2.866e-06$	2.0	$7.346e-02$	$4.036e-06$	2.0	$9.075e-02$
320	$3.13e-03$	$7.164e-07$	2.0	$7.336e-02$	$1.018e-06$	2.0	$9.680e-02$

Table 62: Numerical experiment `ewa121` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.150e-02$			$6.150e-02$		
20	$5.00e-02$	$3.165e-02$	1.0	$5.587e-01$	$3.165e-02$	1.0	$5.587e-01$
40	$2.50e-02$	$1.604e-02$	1.0	$5.975e-01$	$1.604e-02$	1.0	$5.975e-01$
80	$1.25e-02$	$8.072e-03$	1.0	$6.200e-01$	$8.072e-03$	1.0	$6.200e-01$
160	$6.25e-03$	$4.049e-03$	1.0	$6.330e-01$	$4.049e-03$	1.0	$6.330e-01$
320	$3.13e-03$	$2.028e-03$	1.0	$6.404e-01$	$2.028e-03$	1.0	$6.404e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.631e-05$			$3.631e-05$		
20	$5.00e-02$	$6.260e-06$	2.5	$1.247e-02$	$6.691e-06$	2.4	$9.998e-03$
40	$2.50e-02$	$1.538e-06$	2.0	$2.697e-03$	$1.605e-06$	2.1	$3.197e-03$
80	$1.25e-02$	$3.829e-07$	2.0	$2.519e-03$	$3.920e-07$	2.0	$2.911e-03$
160	$6.25e-03$	$9.563e-08$	2.0	$2.466e-03$	$9.681e-08$	2.0	$2.712e-03$
320	$3.13e-03$	$2.390e-08$	2.0	$2.453e-03$	$2.405e-08$	2.0	$2.594e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.851e-02$			$7.851e-02$		
20	$5.00e-02$	$3.994e-02$	1.0	$7.413e-01$	$3.994e-02$	1.0	$7.413e-01$
40	$2.50e-02$	$2.013e-02$	1.0	$7.716e-01$	$2.013e-02$	1.0	$7.716e-01$
80	$1.25e-02$	$1.010e-02$	1.0	$7.889e-01$	$1.010e-02$	1.0	$7.889e-01$
160	$6.25e-03$	$5.062e-03$	1.0	$7.988e-01$	$5.062e-03$	1.0	$7.988e-01$
320	$3.13e-03$	$2.533e-03$	1.0	$8.044e-01$	$2.533e-03$	1.0	$8.044e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.450e-05$			$2.450e-05$		
20	$5.00e-02$	$3.070e-06$	3.0	$2.432e-02$	$3.070e-06$	3.0	$2.432e-02$
40	$2.50e-02$	$3.840e-07$	3.0	$2.450e-02$	$3.840e-07$	3.0	$2.450e-02$
80	$1.25e-02$	$4.801e-08$	3.0	$2.456e-02$	$4.801e-08$	3.0	$2.456e-02$
160	$6.25e-03$	$6.001e-09$	3.0	$2.457e-02$	$6.001e-09$	3.0	$2.457e-02$
320	$3.13e-03$	$7.501e-10$	3.0	$2.458e-02$	$7.501e-10$	3.0	$2.458e-02$

Table 63: Numerical experiment `ewa121` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.484e-06$			$3.797e-06$		
20	$5.00e-02$	$3.750e-07$	3.2	$5.730e-03$	$4.759e-07$	3.0	$3.765e-03$
40	$2.50e-02$	$4.296e-08$	3.1	$4.371e-03$	$5.953e-08$	3.0	$3.797e-03$
80	$1.25e-02$	$5.119e-09$	3.1	$3.545e-03$	$7.442e-09$	3.0	$3.807e-03$
160	$6.25e-03$	$6.252e-10$	3.0	$3.038e-03$	$9.304e-10$	3.0	$3.806e-03$
320	$3.13e-03$	$7.187e-11$	3.1	$4.725e-03$	$1.160e-10$	3.0	$3.882e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.127e-08$			$1.028e-07$		
20	$5.00e-02$	$5.694e-09$	4.0	$9.179e-04$	$7.043e-09$	3.9	$7.580e-04$
40	$2.50e-02$	$3.552e-10$	4.0	$9.186e-04$	$4.605e-10$	3.9	$9.272e-04$
80	$1.25e-02$	$2.220e-11$	4.0	$9.088e-04$	$2.943e-11$	4.0	$1.046e-03$
160	$6.25e-03$	$1.389e-12$	4.0	$9.061e-04$	$1.858e-12$	4.0	$1.132e-03$
320	$3.13e-03$	$8.737e-14$	4.0	$8.660e-04$	$1.165e-13$	4.0	$1.191e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.342e-05$			$4.342e-05$		
20	$5.00e-02$	$5.460e-06$	3.0	$4.258e-02$	$5.460e-06$	3.0	$4.258e-02$
40	$2.50e-02$	$6.846e-07$	3.0	$4.311e-02$	$6.846e-07$	3.0	$4.311e-02$
80	$1.25e-02$	$8.571e-08$	3.0	$4.346e-02$	$8.571e-08$	3.0	$4.346e-02$
160	$6.25e-03$	$1.072e-08$	3.0	$4.372e-02$	$1.072e-08$	3.0	$4.372e-02$
320	$3.13e-03$	$1.352e-09$	3.0	$4.114e-02$	$1.352e-09$	3.0	$4.114e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.849e-09$			$4.161e-08$		
20	$5.00e-02$	$1.828e-10$	5.0	$5.850e-04$	$2.682e-09$	4.0	$3.758e-04$
40	$2.50e-02$	$5.712e-12$	5.0	$5.848e-04$	$1.696e-10$	4.0	$4.076e-04$
80	$1.25e-02$	$1.783e-13$	5.0	$5.885e-04$	$1.065e-11$	4.0	$4.229e-04$
160	$6.25e-03$	$5.712e-15$	5.0	$4.996e-04$	$6.661e-13$	4.0	$4.350e-04$
320	$3.13e-03$	$9.770e-15$	-0.8	$1.121e-16$	$4.030e-14$	4.0	$5.539e-04$

Table 64: Numerical experiment `ewa121` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.490e-06$			$6.490e-06$		
20	$5.00e-02$	$8.292e-07$	3.0	$6.037e-03$	$8.292e-07$	3.0	$6.037e-03$
40	$2.50e-02$	$1.047e-07$	3.0	$6.337e-03$	$1.047e-07$	3.0	$6.337e-03$
80	$1.25e-02$	$1.317e-08$	3.0	$6.498e-03$	$1.317e-08$	3.0	$6.498e-03$
160	$6.25e-03$	$1.627e-09$	3.0	$7.259e-03$	$1.627e-09$	3.0	$7.259e-03$
320	$3.13e-03$	$1.648e-10$	3.3	$3.117e-02$	$1.648e-10$	3.3	$3.117e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.006e-09$			$2.400e-09$		
20	$5.00e-02$	$1.184e-10$	4.1	$2.425e-05$	$1.335e-10$	4.2	$3.537e-05$
40	$2.50e-02$	$7.302e-12$	4.0	$2.006e-05$	$7.814e-12$	4.1	$2.837e-05$
80	$1.25e-02$	$4.491e-13$	4.0	$2.037e-05$	$4.697e-13$	4.1	$2.460e-05$
160	$6.25e-03$	$2.942e-14$	3.9	$1.366e-05$	$2.942e-14$	4.0	$1.898e-05$
320	$3.13e-03$	$9.437e-15$	1.6	$1.215e-10$	$9.437e-15$	1.6	$1.215e-10$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.645e-05$			$1.645e-05$		
20	$5.00e-02$	$2.065e-06$	3.0	$1.623e-02$	$2.065e-06$	3.0	$1.623e-02$
40	$2.50e-02$	$2.586e-07$	3.0	$1.639e-02$	$2.586e-07$	3.0	$1.639e-02$
80	$1.25e-02$	$3.235e-08$	3.0	$1.647e-02$	$3.235e-08$	3.0	$1.647e-02$
160	$6.25e-03$	$4.044e-09$	3.0	$1.655e-02$	$4.044e-09$	3.0	$1.655e-02$
320	$3.13e-03$	$5.024e-10$	3.0	$1.732e-02$	$5.024e-10$	3.0	$1.732e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.152e-10$			$7.152e-10$		
20	$5.00e-02$	$2.237e-11$	5.0	$7.129e-05$	$2.237e-11$	5.0	$7.129e-05$
40	$2.50e-02$	$6.988e-13$	5.0	$7.177e-05$	$6.988e-13$	5.0	$7.177e-05$
80	$1.25e-02$	$2.188e-14$	5.0	$7.087e-05$	$2.188e-14$	5.0	$7.087e-05$
160	$6.25e-03$	$1.665e-15$	3.7	$2.575e-07$	$1.665e-15$	3.7	$2.575e-07$
320	$3.13e-03$	$1.443e-15$	0.2	$4.748e-15$	$1.443e-15$	0.2	$4.748e-15$

Table 65: Numerical experiment `ewa121` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.556e-10$			$9.556e-10$		
20	$5.00e-02$	$3.192e-11$	4.9	$7.656e-05$	$3.192e-11$	4.9	$7.656e-05$
40	$2.50e-02$	$5.488e-12$	2.5	$6.441e-08$	$5.488e-12$	2.5	$6.441e-08$
80	$1.25e-02$	$6.290e-12$	-0.2	$2.655e-12$	$6.290e-12$	-0.2	$2.655e-12$
160	$6.25e-03$	$5.139e-11$	-3.0	$1.077e-17$	$5.139e-11$	-3.0	$1.077e-17$
320	$3.13e-03$	$3.859e-11$	0.4	$4.182e-10$	$3.859e-11$	0.4	$4.182e-10$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.431e-12$			$5.191e-12$		
20	$5.00e-02$	$6.917e-14$	6.0	$4.443e-06$	$8.549e-14$	5.9	$4.359e-06$
40	$2.50e-02$	$1.299e-14$	2.4	$9.526e-11$	$1.299e-14$	2.7	$2.941e-10$
80	$1.25e-02$	$1.521e-14$	-0.2	$5.609e-15$	$1.521e-14$	-0.2	$5.609e-15$
160	$6.25e-03$	$1.232e-14$	0.3	$5.754e-14$	$1.232e-14$	0.3	$5.754e-14$
320	$3.13e-03$	$3.331e-14$	-1.4	$8.494e-18$	$3.331e-14$	-1.4	$8.494e-18$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.615e-09$			$6.615e-09$		
20	$5.00e-02$	$2.071e-10$	5.0	$6.576e-04$	$2.071e-10$	5.0	$6.576e-04$
40	$2.50e-02$	$5.275e-12$	5.3	$1.604e-03$	$5.275e-12$	5.3	$1.604e-03$
80	$1.25e-02$	$3.346e-12$	0.7	$5.947e-11$	$3.346e-12$	0.7	$5.947e-11$
160	$6.25e-03$	$5.057e-12$	-0.6	$2.457e-13$	$5.057e-12$	-0.6	$2.457e-13$
320	$3.13e-03$	$1.094e-11$	-1.1	$1.782e-14$	$1.094e-11$	-1.1	$1.782e-14$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.396e-13$			$8.357e-13$		
20	$5.00e-02$	$8.824e-16$	7.3	$2.820e-06$	$1.321e-14$	6.0	$8.037e-07$
40	$2.50e-02$	$5.551e-16$	0.7	$6.542e-15$	$5.551e-16$	4.6	$1.176e-08$
80	$1.25e-02$	$1.332e-15$	-1.3	$5.259e-18$	$1.443e-15$	-1.4	$3.435e-18$
160	$6.25e-03$	$3.664e-15$	-1.5	$2.224e-18$	$3.664e-15$	-1.3	$3.997e-18$
320	$3.13e-03$	$4.774e-15$	-0.4	$5.275e-16$	$4.774e-15$	-0.4	$5.275e-16$

Table 66: Numerical experiment `ewa121` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x_1}$ at Grid `tau`			Error for $\boldsymbol{x_1}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.492e-002$		$3.937e-001$	$4.492e-002$		$3.937e-001$
20	$5.00e-002$	$2.337e-002$	0.9	$3.937e-001$	$2.337e-002$	0.9	$3.937e-001$
40	$2.50e-002$	$1.197e-002$	1.0	$4.211e-001$	$1.197e-002$	1.0	$4.211e-001$
80	$1.25e-002$	$6.081e-003$	1.0	$4.400e-001$	$6.081e-003$	1.0	$4.400e-001$
160	$6.25e-003$	$3.071e-003$	1.0	$4.565e-001$	$3.071e-003$	1.0	$4.565e-001$
320	$3.13e-003$	$1.546e-003$	1.0	$4.690e-001$	$1.546e-003$	1.0	$4.690e-001$

Uniform Mesh		Error for $\boldsymbol{x_2}$ at Grid `tau`			Error for $\boldsymbol{x_2}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.558e-002$		$6.496e-001$	$5.558e-002$		$6.496e-001$
20	$5.00e-002$	$2.651e-002$	1.1	$6.496e-001$	$2.651e-002$	1.1	$6.496e-001$
40	$2.50e-002$	$1.290e-002$	1.0	$5.976e-001$	$1.290e-002$	1.0	$5.976e-001$
80	$1.25e-002$	$6.351e-003$	1.0	$5.590e-001$	$6.351e-003$	1.0	$5.590e-001$
160	$6.25e-003$	$3.151e-003$	1.0	$5.341e-001$	$3.151e-003$	1.0	$5.341e-001$
320	$3.13e-003$	$1.569e-003$	1.0	$5.193e-001$	$1.569e-003$	1.0	$5.193e-001$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.412e-004$		$7.607e-002$	$8.018e-004$		$5.170e-002$
20	$5.00e-002$	$1.839e-004$	2.0	$7.607e-002$	$2.288e-004$	1.8	$7.607e-002$
40	$2.50e-002$	$4.587e-005$	2.0	$7.416e-002$	$6.126e-005$	1.9	$7.416e-002$
80	$1.25e-002$	$1.146e-005$	2.0	$7.352e-002$	$1.586e-005$	1.9	$7.352e-002$
160	$6.25e-003$	$2.866e-006$	2.0	$7.346e-002$	$4.036e-006$	2.0	$7.346e-002$
320	$3.13e-003$	$7.164e-007$	2.0	$7.336e-002$	$1.018e-006$	2.0	$7.336e-002$

Table 67: Numerical experiment `ewa121bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.418e-002$		$2.366e-001$	$2.418e-002$		$2.366e-001$
20	$5.00e-002$	$1.217e-002$	1.0	$2.366e-001$	$1.217e-002$	1.0	$2.366e-001$
40	$2.50e-002$	$6.095e-003$	1.0	$2.417e-001$	$6.095e-003$	1.0	$2.417e-001$
80	$1.25e-002$	$3.049e-003$	1.0	$2.433e-001$	$3.049e-003$	1.0	$2.433e-001$
160	$6.25e-003$	$1.525e-003$	1.0	$2.438e-001$	$1.525e-003$	1.0	$2.438e-001$
320	$3.13e-003$	$7.623e-004$	1.0	$2.439e-001$	$7.623e-004$	1.0	$2.439e-001$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.423e-002$		$2.382e-001$	$2.423e-002$		$2.382e-001$
20	$5.00e-002$	$1.218e-002$	1.0	$2.382e-001$	$1.218e-002$	1.0	$2.382e-001$
40	$2.50e-002$	$6.096e-003$	1.0	$2.422e-001$	$6.096e-003$	1.0	$2.422e-001$
80	$1.25e-002$	$3.049e-003$	1.0	$2.434e-001$	$3.049e-003$	1.0	$2.434e-001$
160	$6.25e-003$	$1.525e-003$	1.0	$2.438e-001$	$1.525e-003$	1.0	$2.438e-001$
320	$3.13e-003$	$7.623e-004$	1.0	$2.439e-001$	$7.623e-004$	1.0	$2.439e-001$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.631e-005$		$1.247e-002$	$3.631e-005$		$9.998e-003$
20	$5.00e-002$	$6.260e-006$	2.5	$1.247e-002$	$6.691e-006$	2.4	$1.247e-002$
40	$2.50e-002$	$1.538e-006$	2.0	$2.697e-003$	$1.605e-006$	2.1	$2.697e-003$
80	$1.25e-002$	$3.829e-007$	2.0	$2.519e-003$	$3.920e-007$	2.0	$2.519e-003$
160	$6.25e-003$	$9.563e-008$	2.0	$2.466e-003$	$9.681e-008$	2.0	$2.466e-003$
320	$3.13e-003$	$2.390e-008$	2.0	$2.453e-003$	$2.405e-008$	2.0	$2.453e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.673e-002$		$4.620e-001$	$4.673e-002$		$4.620e-001$
20	$5.00e-002$	$2.344e-002$	1.0	$4.620e-001$	$2.344e-002$	1.0	$4.620e-001$
40	$2.50e-002$	$1.173e-002$	1.0	$4.672e-001$	$1.173e-002$	1.0	$4.672e-001$
80	$1.25e-002$	$5.867e-003$	1.0	$4.687e-001$	$5.867e-003$	1.0	$4.687e-001$
160	$6.25e-003$	$2.934e-003$	1.0	$4.692e-001$	$2.934e-003$	1.0	$4.692e-001$
320	$3.13e-003$	$1.467e-003$	1.0	$4.694e-001$	$1.467e-003$	1.0	$4.694e-001$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.676e-002$		$4.632e-001$	$4.676e-002$		$4.632e-001$
20	$5.00e-002$	$2.345e-002$	1.0	$4.632e-001$	$2.345e-002$	1.0	$4.632e-001$
40	$2.50e-002$	$1.173e-002$	1.0	$4.675e-001$	$1.173e-002$	1.0	$4.675e-001$
80	$1.25e-002$	$5.867e-003$	1.0	$4.689e-001$	$5.867e-003$	1.0	$4.689e-001$
160	$6.25e-003$	$2.934e-003$	1.0	$4.692e-001$	$2.934e-003$	1.0	$4.692e-001$
320	$3.13e-003$	$1.467e-003$	1.0	$4.694e-001$	$1.467e-003$	1.0	$4.694e-001$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.450e-005$		$2.432e-002$	$2.450e-005$		$2.432e-002$
20	$5.00e-002$	$3.070e-006$	3.0	$2.432e-002$	$3.070e-006$	3.0	$2.432e-002$
40	$2.50e-002$	$3.840e-007$	3.0	$2.450e-002$	$3.840e-007$	3.0	$2.450e-002$
80	$1.25e-002$	$4.801e-008$	3.0	$2.456e-002$	$4.801e-008$	3.0	$2.456e-002$
160	$6.25e-003$	$6.001e-009$	3.0	$2.457e-002$	$6.001e-009$	3.0	$2.457e-002$
320	$3.13e-003$	$7.501e-010$	3.0	$2.458e-002$	$7.501e-010$	3.0	$2.458e-002$

Table 68: Numerical experiment `ewa121bvpsuite` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.025e-005$		$2.029e-002$	$2.025e-005$		$2.029e-002$
20	$5.00e-002$	$2.530e-006$	3.0	$2.029e-002$	$2.530e-006$	3.0	$2.029e-002$
40	$2.50e-002$	$3.162e-007$	3.0	$2.025e-002$	$3.162e-007$	3.0	$2.025e-002$
80	$1.25e-002$	$3.952e-008$	3.0	$2.024e-002$	$3.952e-008$	3.0	$2.024e-002$
160	$6.25e-003$	$4.940e-009$	3.0	$2.024e-002$	$4.940e-009$	3.0	$2.024e-002$
320	$3.13e-003$	$6.178e-010$	3.0	$2.015e-002$	$6.178e-010$	3.0	$2.015e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.636e-006$		$4.704e-003$	$4.636e-006$		$4.704e-003$
20	$5.00e-002$	$5.770e-007$	3.0	$4.704e-003$	$5.770e-007$	3.0	$4.704e-003$
40	$2.50e-002$	$7.205e-008$	3.0	$4.638e-003$	$7.205e-008$	3.0	$4.638e-003$
80	$1.25e-002$	$9.002e-009$	3.0	$4.621e-003$	$9.002e-009$	3.0	$4.621e-003$
160	$6.25e-003$	$1.125e-009$	3.0	$4.619e-003$	$1.125e-009$	3.0	$4.619e-003$
320	$3.13e-003$	$1.410e-010$	3.0	$4.527e-003$	$1.410e-010$	3.0	$4.527e-003$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$9.127e-008$		$9.179e-004$	$1.028e-007$		$7.580e-004$
20	$5.00e-002$	$5.694e-009$	4.0	$9.179e-004$	$7.043e-009$	3.9	$9.179e-004$
40	$2.50e-002$	$3.552e-010$	4.0	$9.185e-004$	$4.605e-010$	3.9	$9.185e-004$
80	$1.25e-002$	$2.220e-011$	4.0	$9.094e-004$	$2.943e-011$	4.0	$9.094e-004$
160	$6.25e-003$	$1.387e-012$	4.0	$9.103e-004$	$1.860e-012$	4.0	$9.103e-004$
320	$3.13e-003$	$8.673e-014$	4.0	$9.077e-004$	$1.169e-013$	4.0	$9.077e-004$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.263e-005$		$5.263e-002$	$5.263e-005$		$5.263e-002$
20	$5.00e-002$	$6.580e-006$	3.0	$5.263e-002$	$6.580e-006$	3.0	$5.263e-002$
40	$2.50e-002$	$8.225e-007$	3.0	$5.263e-002$	$8.225e-007$	3.0	$5.263e-002$
80	$1.25e-002$	$1.028e-007$	3.0	$5.264e-002$	$1.028e-007$	3.0	$5.264e-002$
160	$6.25e-003$	$1.285e-008$	3.0	$5.266e-002$	$1.285e-008$	3.0	$5.266e-002$
320	$3.13e-003$	$1.606e-009$	3.0	$5.273e-002$	$1.606e-009$	3.0	$5.273e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.431e-005$		$4.432e-002$	$4.431e-005$		$4.432e-002$
20	$5.00e-002$	$5.538e-006$	3.0	$4.432e-002$	$5.538e-006$	3.0	$4.432e-002$
40	$2.50e-002$	$6.923e-007$	3.0	$4.431e-002$	$6.923e-007$	3.0	$4.431e-002$
80	$1.25e-002$	$8.653e-008$	3.0	$4.430e-002$	$8.653e-008$	3.0	$4.430e-002$
160	$6.25e-003$	$1.082e-008$	3.0	$4.433e-002$	$1.082e-008$	3.0	$4.433e-002$
320	$3.13e-003$	$1.352e-009$	3.0	$4.440e-002$	$1.352e-009$	3.0	$4.440e-002$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.849e-009$		$5.850e-004$	$4.161e-008$		$3.758e-004$
20	$5.00e-002$	$1.828e-010$	5.0	$5.850e-004$	$2.682e-009$	4.0	$5.850e-004$
40	$2.50e-002$	$5.712e-012$	5.0	$5.849e-004$	$1.696e-010$	4.0	$5.849e-004$
80	$1.25e-002$	$1.785e-013$	5.0	$5.849e-004$	$1.065e-011$	4.0	$5.849e-004$
160	$6.25e-003$	$5.577e-015$	5.0	$5.852e-004$	$6.673e-013$	4.0	$5.852e-004$
320	$3.13e-003$	$1.743e-016$	5.0	$5.848e-004$	$4.174e-014$	4.0	$5.848e-004$

Table 69: Numerical experiment `ewa121bvpsuite` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.938e-006$		$2.904e-003$	$2.938e-006$		$2.904e-003$
20	$5.00e-002$	$3.685e-007$	3.0	$2.904e-003$	$3.685e-007$	3.0	$2.904e-003$
40	$2.50e-002$	$4.610e-008$	3.0	$2.937e-003$	$4.610e-008$	3.0	$2.937e-003$
80	$1.25e-002$	$5.766e-009$	3.0	$2.941e-003$	$5.766e-009$	3.0	$2.941e-003$
160	$6.25e-003$	$7.206e-010$	3.0	$2.955e-003$	$7.206e-010$	3.0	$2.955e-003$
320	$3.13e-003$	$9.552e-011$	2.9	$1.920e-003$	$9.552e-011$	2.9	$1.920e-003$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.945e-006$		$2.928e-003$	$2.945e-006$		$2.928e-003$
20	$5.00e-002$	$3.687e-007$	3.0	$2.928e-003$	$3.687e-007$	3.0	$2.928e-003$
40	$2.50e-002$	$4.611e-008$	3.0	$2.944e-003$	$4.611e-008$	3.0	$2.944e-003$
80	$1.25e-002$	$5.766e-009$	3.0	$2.943e-003$	$5.766e-009$	3.0	$2.943e-003$
160	$6.25e-003$	$7.206e-010$	3.0	$2.956e-003$	$7.206e-010$	3.0	$2.956e-003$
320	$3.13e-003$	$9.552e-011$	2.9	$1.920e-003$	$9.552e-011$	2.9	$1.920e-003$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.006e-009$		$2.425e-005$	$2.400e-009$		$3.537e-005$
20	$5.00e-002$	$1.184e-010$	4.1	$2.425e-005$	$1.335e-010$	4.2	$2.425e-005$
40	$2.50e-002$	$7.299e-012$	4.0	$2.010e-005$	$7.814e-012$	4.1	$2.010e-005$
80	$1.25e-002$	$4.545e-013$	4.0	$1.907e-005$	$4.711e-013$	4.1	$1.907e-005$
160	$6.25e-003$	$2.835e-014$	4.0	$1.886e-005$	$2.887e-014$	4.0	$1.886e-005$
320	$3.13e-003$	$1.742e-015$	4.0	$2.104e-005$	$1.762e-015$	4.0	$2.104e-005$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.430e-005$		$1.425e-002$	$1.430e-005$		$1.425e-002$
20	$5.00e-002$	$1.790e-006$	3.0	$1.425e-002$	$1.790e-006$	3.0	$1.425e-002$
40	$2.50e-002$	$2.238e-007$	3.0	$1.430e-002$	$2.238e-007$	3.0	$1.430e-002$
80	$1.25e-002$	$2.798e-008$	3.0	$1.432e-002$	$2.798e-008$	3.0	$1.432e-002$
160	$6.25e-003$	$3.496e-009$	3.0	$1.436e-002$	$3.496e-009$	3.0	$1.436e-002$
320	$3.13e-003$	$4.381e-010$	3.0	$1.404e-002$	$4.381e-010$	3.0	$1.404e-002$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.431e-005$		$1.426e-002$	$1.431e-005$		$1.426e-002$
20	$5.00e-002$	$1.790e-006$	3.0	$1.426e-002$	$1.790e-006$	3.0	$1.426e-002$
40	$2.50e-002$	$2.238e-007$	3.0	$1.430e-002$	$2.238e-007$	3.0	$1.430e-002$
80	$1.25e-002$	$2.798e-008$	3.0	$1.432e-002$	$2.798e-008$	3.0	$1.432e-002$
160	$6.25e-003$	$3.496e-009$	3.0	$1.436e-002$	$3.496e-009$	3.0	$1.436e-002$
320	$3.13e-003$	$4.381e-010$	3.0	$1.404e-002$	$4.381e-010$	3.0	$1.404e-002$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.152e-010$		$7.129e-005$	$7.152e-010$		$7.129e-005$
20	$5.00e-002$	$2.237e-011$	5.0	$7.129e-005$	$2.237e-011$	5.0	$7.129e-005$
40	$2.50e-002$	$6.993e-013$	5.0	$7.152e-005$	$6.993e-013$	5.0	$7.152e-005$
80	$1.25e-002$	$2.185e-014$	5.0	$7.160e-005$	$2.185e-014$	5.0	$7.160e-005$
160	$6.25e-003$	$6.828e-016$	5.0	$7.175e-005$	$6.828e-016$	5.0	$7.175e-005$
320	$3.13e-003$	$9.021e-017$	2.9	$1.864e-009$	$1.041e-016$	2.7	$1.864e-009$

Table 70: Numerical experiment `ewa121bvpsuite` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.497e-009$		$2.512e-004$	$2.497e-009$		$2.512e-004$
20	$5.00e-002$	$7.791e-011$	5.0	$2.512e-004$	$7.791e-011$	5.0	$2.512e-004$
40	$2.50e-002$	$1.349e-012$	5.9	$3.195e-003$	$1.349e-012$	5.9	$3.195e-003$
80	$1.25e-002$	$3.992e-013$	1.8	$8.816e-010$	$3.992e-013$	1.8	$8.816e-010$
160	$6.25e-003$	$2.733e-012$	-2.8	$2.085e-018$	$2.733e-012$	-2.8	$2.085e-018$
320	$3.13e-003$	$1.825e-012$	0.6	$5.248e-011$	$1.825e-012$	0.6	$5.248e-011$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.213e-009$		$1.230e-004$	$1.213e-009$		$1.230e-004$
20	$5.00e-002$	$3.773e-011$	5.0	$1.230e-004$	$3.773e-011$	5.0	$1.230e-004$
40	$2.50e-002$	$4.476e-013$	6.4	$7.937e-003$	$4.476e-013$	6.4	$7.937e-003$
80	$1.25e-002$	$3.810e-013$	0.2	$1.055e-012$	$3.810e-013$	0.2	$1.055e-012$
160	$6.25e-003$	$2.734e-012$	-2.8	$1.479e-018$	$2.734e-012$	-2.8	$1.479e-018$
320	$3.13e-003$	$1.826e-012$	0.6	$5.266e-011$	$1.826e-012$	0.6	$5.266e-011$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.432e-012$		$4.446e-006$	$5.192e-012$		$4.117e-006$
20	$5.00e-002$	$6.919e-014$	6.0	$4.446e-006$	$8.699e-014$	5.9	$4.446e-006$
40	$2.50e-002$	$1.089e-015$	6.0	$4.283e-006$	$1.443e-015$	5.9	$4.283e-006$
80	$1.25e-002$	$1.804e-016$	2.6	$1.560e-011$	$2.220e-016$	2.7	$1.560e-011$
160	$6.25e-003$	$1.943e-016$	-0.1	$1.129e-016$	$2.359e-016$	-0.1	$1.129e-016$
320	$3.13e-003$	$1.804e-016$	0.1	$3.343e-016$	$2.082e-016$	0.2	$3.343e-016$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa121	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.724e-009$		$6.660e-004$	$6.724e-009$		$6.660e-004$
20	$5.00e-002$	$2.107e-010$	5.0	$6.660e-004$	$2.107e-010$	5.0	$6.660e-004$
40	$2.50e-002$	$5.441e-012$	5.3	$1.538e-003$	$5.441e-012$	5.3	$1.538e-003$
80	$1.25e-002$	$4.462e-013$	3.6	$3.280e-006$	$4.462e-013$	3.6	$3.280e-006$
160	$6.25e-003$	$1.028e-012$	-1.2	$2.283e-015$	$1.028e-012$	-1.2	$2.283e-015$
320	$3.13e-003$	$9.509e-012$	-3.2	$8.665e-020$	$9.509e-012$	-3.2	$8.665e-020$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.394e-009$		$6.331e-004$	$6.394e-009$		$6.331e-004$
20	$5.00e-002$	$2.004e-010$	5.0	$6.331e-004$	$2.004e-010$	5.0	$6.331e-004$
40	$2.50e-002$	$5.118e-012$	5.3	$1.534e-003$	$5.118e-012$	5.3	$1.534e-003$
80	$1.25e-002$	$4.563e-013$	3.5	$1.978e-006$	$4.563e-013$	3.5	$1.978e-006$
160	$6.25e-003$	$1.028e-012$	-1.2	$2.694e-015$	$1.028e-012$	-1.2	$2.694e-015$
320	$3.13e-003$	$9.509e-012$	-3.2	$8.643e-020$	$9.509e-012$	-3.2	$8.643e-020$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.395e-013$		$1.382e-006$	$8.361e-013$		$7.674e-007$
20	$5.00e-002$	$1.092e-015$	7.0	$1.382e-006$	$1.341e-014$	6.0	$1.382e-006$
40	$2.50e-002$	$1.041e-016$	3.4	$2.827e-011$	$3.192e-016$	5.4	$2.827e-011$
80	$1.25e-002$	$1.388e-016$	-0.4	$2.251e-017$	$1.527e-016$	1.1	$2.251e-017$
160	$6.25e-003$	$1.665e-016$	-0.3	$4.383e-017$	$1.804e-016$	-0.2	$4.383e-017$
320	$3.13e-003$	$1.665e-016$	0.0	$1.665e-016$	$1.665e-016$	0.1	$1.665e-016$

Table 71: Numerical experiment `ewa121bvpsuite` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for x at Grid tau**			**Error for x at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.788e+01$			$5.788e+01$		
20	$5.00e-02$	$1.631e+01$	1.8	$3.888e+03$	$1.631e+01$	1.8	$3.888e+03$
40	$2.50e-02$	$4.332e+00$	1.9	$5.022e+03$	$4.332e+00$	1.9	$5.022e+03$
80	$1.25e-02$	$1.117e+00$	2.0	$5.894e+03$	$1.117e+00$	2.0	$5.894e+03$
160	$6.25e-03$	$2.834e-01$	2.0	$6.488e+03$	$2.834e-01$	2.0	$6.488e+03$
320	$3.13e-03$	$7.140e-02$	2.0	$6.860e+03$	$7.140e-02$	2.0	$6.860e+03$

Uniform Mesh		**Error for u at Grid tau**			**Error for u at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.351e+00$			$4.351e+00$		
20	$5.00e-02$	$1.104e+00$	2.0	$4.138e+02$	$1.104e+00$	2.0	$4.138e+02$
40	$2.50e-02$	$2.771e-01$	2.0	$4.345e+02$	$2.771e-01$	2.0	$4.345e+02$
80	$1.25e-02$	$6.934e-02$	2.0	$4.411e+02$	$6.934e-02$	2.0	$4.411e+02$
160	$6.25e-03$	$1.734e-02$	2.0	$4.431e+02$	$1.734e-02$	2.0	$4.431e+02$
320	$3.13e-03$	$4.335e-03$	2.0	$4.437e+02$	$4.335e-03$	2.0	$4.437e+02$

Table 72: Numerical experiment `ewa122` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.322e+01$			$1.322e+01$		
20	$5.00e-02$	$3.345e+00$	2.0	$1.271e+03$	$3.345e+00$	2.0	$1.271e+03$
40	$2.50e-02$	$8.409e-01$	2.0	$1.307e+03$	$8.409e-01$	2.0	$1.307e+03$
80	$1.25e-02$	$2.110e-01$	2.0	$1.320e+03$	$2.110e-01$	2.0	$1.320e+03$
160	$6.25e-03$	$5.291e-02$	2.0	$1.324e+03$	$5.291e-02$	2.0	$1.324e+03$
320	$3.13e-03$	$1.327e-02$	2.0	$1.326e+03$	$1.327e-02$	2.0	$1.326e+03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.122e-01$			$7.122e-01$		
20	$5.00e-02$	$1.729e-01$	2.0	$7.847e+01$	$1.729e-01$	2.0	$7.847e+01$
40	$2.50e-02$	$4.290e-02$	2.0	$7.152e+01$	$4.290e-02$	2.0	$7.152e+01$
80	$1.25e-02$	$1.070e-02$	2.0	$6.935e+01$	$1.070e-02$	2.0	$6.935e+01$
160	$6.25e-03$	$2.675e-03$	2.0	$6.871e+01$	$2.675e-03$	2.0	$6.871e+01$
320	$3.13e-03$	$6.685e-04$	2.0	$6.853e+01$	$6.685e-04$	2.0	$6.853e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.932e+00$			$9.932e+00$		
20	$5.00e-02$	$2.511e+00$	2.0	$9.572e+02$	$2.511e+00$	2.0	$9.572e+02$
40	$2.50e-02$	$6.310e-01$	2.0	$9.819e+02$	$6.310e-01$	2.0	$9.819e+02$
80	$1.25e-02$	$1.583e-01$	2.0	$9.906e+02$	$1.583e-01$	2.0	$9.906e+02$
160	$6.25e-03$	$3.970e-02$	2.0	$9.936e+02$	$3.970e-02$	2.0	$9.936e+02$
320	$3.13e-03$	$9.954e-03$	2.0	$9.948e+02$	$9.954e-03$	2.0	$9.948e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.172e-02$			$1.978e-01$		
20	$5.00e-02$	$2.029e-03$	4.0	$2.937e+02$	$2.726e-02$	2.9	$1.428e+02$
40	$2.50e-02$	$1.275e-04$	4.0	$3.165e+02$	$3.565e-03$	2.9	$1.796e+02$
80	$1.25e-02$	$7.984e-06$	4.0	$3.240e+02$	$4.553e-04$	3.0	$2.035e+02$
160	$6.25e-03$	$4.992e-07$	4.0	$3.262e+02$	$5.751e-05$	3.0	$2.181e+02$
320	$3.13e-03$	$3.120e-08$	4.0	$3.269e+02$	$7.226e-06$	3.0	$2.268e+02$

Table 73: Numerical experiment `ewa122` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.963e-01$			$2.963e-01$		
20	$5.00e-02$	$2.089e-02$	3.8	$1.986e+03$	$2.089e-02$	3.8	$1.986e+03$
40	$2.50e-02$	$1.387e-03$	3.9	$2.570e+03$	$1.387e-03$	3.9	$2.570e+03$
80	$1.25e-02$	$8.941e-05$	4.0	$3.019e+03$	$8.941e-05$	4.0	$3.019e+03$
160	$6.25e-03$	$5.675e-06$	4.0	$3.324e+03$	$5.675e-06$	4.0	$3.324e+03$
320	$3.13e-03$	$3.575e-07$	4.0	$3.508e+03$	$3.575e-07$	4.0	$3.508e+03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.546e-02$			$1.546e-02$		
20	$5.00e-02$	$9.868e-04$	4.0	$1.443e+02$	$9.868e-04$	4.0	$1.443e+02$
40	$2.50e-02$	$6.200e-05$	4.0	$1.543e+02$	$6.200e-05$	4.0	$1.543e+02$
80	$1.25e-02$	$3.880e-06$	4.0	$1.576e+02$	$3.880e-06$	4.0	$1.576e+02$
160	$6.25e-03$	$2.426e-07$	4.0	$1.586e+02$	$2.426e-07$	4.0	$1.586e+02$
320	$3.13e-03$	$1.516e-08$	4.0	$1.589e+02$	$1.516e-08$	4.0	$1.589e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.687e-01$			$1.687e-01$		
20	$5.00e-02$	$1.199e-02$	3.8	$1.101e+03$	$1.199e-02$	3.8	$1.101e+03$
40	$2.50e-02$	$7.993e-04$	3.9	$1.450e+03$	$7.993e-04$	3.9	$1.450e+03$
80	$1.25e-02$	$5.161e-05$	4.0	$1.722e+03$	$5.161e-05$	4.0	$1.722e+03$
160	$6.25e-03$	$3.278e-06$	4.0	$1.907e+03$	$3.278e-06$	4.0	$1.907e+03$
320	$3.13e-03$	$2.066e-07$	4.0	$2.019e+03$	$2.066e-07$	4.0	$2.019e+03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.113e-05$			$6.495e-03$		
20	$5.00e-02$	$1.300e-06$	6.0	$7.461e+01$	$4.714e-04$	3.8	$3.953e+01$
40	$2.50e-02$	$5.283e-08$	4.6	$1.337e+00$	$3.166e-05$	3.9	$5.524e+01$
80	$1.25e-02$	$3.098e-09$	4.1	$1.896e-01$	$2.050e-06$	3.9	$6.715e+01$
160	$6.25e-03$	$1.880e-10$	4.0	$1.532e-01$	$1.304e-07$	4.0	$7.518e+01$
320	$3.13e-03$	$1.150e-11$	4.0	$1.442e-01$	$8.212e-09$	4.0	$8.080e+01$

Table 74: Numerical experiment `ewa122` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.675e-02$			$3.675e-02$		
20	$5.00e-02$	$2.321e-03$	4.0	$3.548e+02$	$2.321e-03$	4.0	$3.548e+02$
40	$2.50e-02$	$1.459e-04$	4.0	$3.627e+02$	$1.459e-04$	4.0	$3.627e+02$
80	$1.25e-02$	$9.155e-06$	4.0	$3.652e+02$	$9.155e-06$	4.0	$3.652e+02$
160	$6.25e-03$	$5.740e-07$	4.0	$3.677e+02$	$5.740e-07$	4.0	$3.677e+02$
320	$3.13e-03$	$3.382e-08$	4.1	$5.794e+02$	$3.382e-08$	4.1	$5.794e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.672e-03$			$1.672e-03$		
20	$5.00e-02$	$1.032e-04$	4.0	$1.742e+01$	$1.032e-04$	4.0	$1.742e+01$
40	$2.50e-02$	$6.429e-06$	4.0	$1.674e+01$	$6.429e-06$	4.0	$1.674e+01$
80	$1.25e-02$	$4.015e-07$	4.0	$1.653e+01$	$4.015e-07$	4.0	$1.653e+01$
160	$6.25e-03$	$2.509e-08$	4.0	$1.645e+01$	$2.509e-08$	4.0	$1.645e+01$
320	$3.13e-03$	$1.572e-09$	4.0	$1.614e+01$	$1.572e-09$	4.0	$1.614e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.367e-02$			$1.367e-02$		
20	$5.00e-02$	$8.633e-04$	4.0	$1.319e+02$	$8.633e-04$	4.0	$1.319e+02$
40	$2.50e-02$	$5.426e-05$	4.0	$1.349e+02$	$5.426e-05$	4.0	$1.349e+02$
80	$1.25e-02$	$3.405e-06$	4.0	$1.358e+02$	$3.405e-06$	4.0	$1.358e+02$
160	$6.25e-03$	$2.142e-07$	4.0	$1.338e+02$	$2.142e-07$	4.0	$1.338e+02$
320	$3.13e-03$	$1.347e-08$	4.0	$1.340e+02$	$1.347e-08$	4.0	$1.340e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.140e-07$			$1.815e-04$		
20	$5.00e-02$	$2.479e-09$	5.5	$3.805e-02$	$6.356e-06$	4.8	$1.243e+01$
40	$2.50e-02$	$6.384e-11$	5.3	$1.830e-02$	$2.100e-07$	4.9	$1.597e+01$
80	$1.25e-02$	$1.974e-12$	5.0	$6.922e-03$	$6.748e-09$	5.0	$1.856e+01$
160	$6.25e-03$	$7.958e-13$	1.3	$6.150e-10$	$2.134e-10$	5.0	$2.053e+01$
320	$3.13e-03$	$1.080e-12$	-0.4	$8.506e-14$	$6.821e-12$	5.0	$1.896e+01$

Table 75: Numerical experiment `ewa122` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.996e-04$			$4.996e-04$		
20	$5.00e-02$	$8.799e-06$	5.8	$3.355e+02$	$8.799e-06$	5.8	$3.355e+02$
40	$2.50e-02$	$1.459e-07$	5.9	$4.352e+02$	$1.459e-07$	5.9	$4.352e+02$
80	$1.25e-02$	$2.515e-09$	5.9	$3.548e+02$	$2.515e-09$	5.9	$3.548e+02$
160	$6.25e-03$	$8.415e-10$	1.6	$2.550e-06$	$8.415e-10$	1.6	$2.550e-06$
320	$3.13e-03$	$5.167e-09$	-2.6	$1.425e-15$	$5.167e-09$	-2.6	$1.425e-15$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.192e-05$			$2.192e-05$		
20	$5.00e-02$	$3.503e-07$	6.0	$2.034e+01$	$3.503e-07$	6.0	$2.034e+01$
40	$2.50e-02$	$5.502e-09$	6.0	$2.192e+01$	$5.502e-09$	6.0	$2.192e+01$
80	$1.25e-02$	$8.595e-11$	6.0	$2.257e+01$	$8.595e-11$	6.0	$2.257e+01$
160	$6.25e-03$	$6.821e-12$	3.7	$7.775e-04$	$6.821e-12$	3.7	$7.775e-04$
320	$3.13e-03$	$8.811e-12$	-0.4	$1.047e-12$	$8.811e-12$	-0.4	$1.047e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa122	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.359e-04$			$1.359e-04$		
20	$5.00e-02$	$2.409e-06$	5.8	$8.946e+01$	$2.409e-06$	5.8	$8.946e+01$
40	$2.50e-02$	$4.010e-08$	5.9	$1.173e+02$	$4.010e-08$	5.9	$1.173e+02$
80	$1.25e-02$	$7.440e-10$	5.8	$6.583e+01$	$7.440e-10$	5.8	$6.583e+01$
160	$6.25e-03$	$2.952e-10$	1.3	$2.566e-07$	$2.952e-10$	1.3	$2.566e-07$
320	$3.13e-03$	$1.735e-09$	-2.6	$6.890e-16$	$1.735e-09$	-2.6	$6.890e-16$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.900e-10$			$4.003e-06$		
20	$5.00e-02$	$1.218e-12$	7.3	$3.663e-03$	$7.183e-08$	5.8	$2.529e+00$
40	$2.50e-02$	$6.821e-13$	0.8	$1.495e-11$	$1.202e-09$	5.9	$3.413e+00$
80	$1.25e-02$	$1.080e-12$	-0.7	$5.912e-14$	$2.035e-11$	5.9	$3.220e+00$
160	$6.25e-03$	$2.842e-12$	-1.4	$2.382e-15$	$2.842e-12$	2.8	$5.167e-06$
320	$3.13e-03$	$5.684e-12$	-1.0	$1.776e-14$	$5.684e-12$	-1.0	$1.776e-14$

Table 76: Numerical experiment `ewa122` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.761e-02$			$1.761e-02$		
20	$5.00e-02$	$4.532e-03$	2.0	$1.601e+00$	$4.532e-03$	2.0	$1.601e+00$
40	$2.50e-02$	$1.168e-03$	2.0	$1.589e+00$	$1.168e-03$	2.0	$1.589e+00$
80	$1.25e-02$	$3.010e-04$	2.0	$1.591e+00$	$3.010e-04$	2.0	$1.591e+00$
160	$6.25e-03$	$7.749e-05$	2.0	$1.598e+00$	$7.749e-05$	2.0	$1.598e+00$
320	$3.13e-03$	$1.994e-05$	2.0	$1.608e+00$	$1.994e-05$	2.0	$1.608e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.233e-02$			$1.233e-02$		
20	$5.00e-02$	$3.408e-03$	1.9	$8.824e-01$	$3.408e-03$	1.9	$8.824e-01$
40	$2.50e-02$	$8.952e-04$	1.9	$1.101e+00$	$8.952e-04$	1.9	$1.101e+00$
80	$1.25e-02$	$2.293e-04$	2.0	$1.257e+00$	$2.293e-04$	2.0	$1.257e+00$
160	$6.25e-03$	$5.804e-05$	2.0	$1.359e+00$	$5.804e-05$	2.0	$1.359e+00$
320	$3.13e-03$	$1.460e-05$	2.0	$1.421e+00$	$1.460e-05$	2.0	$1.421e+00$

Table 77: Numerical experiment `ewa131` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.311e-04$			$5.857e-04$		
20	$5.00e-02$	$1.238e-04$	1.8	$2.719e-02$	$1.950e-04$	1.6	$2.262e-02$
40	$2.50e-02$	$3.497e-05$	1.8	$2.925e-02$	$6.080e-05$	1.7	$2.999e-02$
80	$1.25e-02$	$9.745e-06$	1.8	$3.139e-02$	$1.821e-05$	1.7	$3.719e-02$
160	$6.25e-03$	$2.687e-06$	1.9	$3.358e-02$	$5.305e-06$	1.8	$4.433e-02$
320	$3.13e-03$	$7.344e-07$	1.9	$3.578e-02$	$1.514e-06$	1.8	$5.144e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.127e-04$			$2.127e-04$		
20	$5.00e-02$	$5.318e-05$	2.0	$2.126e-02$	$5.318e-05$	2.0	$2.126e-02$
40	$2.50e-02$	$1.329e-05$	2.0	$2.128e-02$	$1.329e-05$	2.0	$2.128e-02$
80	$1.25e-02$	$3.323e-06$	2.0	$2.127e-02$	$3.323e-06$	2.0	$2.127e-02$
160	$6.25e-03$	$8.308e-07$	2.0	$2.127e-02$	$8.308e-07$	2.0	$2.127e-02$
320	$3.13e-03$	$2.077e-07$	2.0	$2.127e-02$	$2.077e-07$	2.0	$2.127e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.464e-03$			$1.464e-03$		
20	$5.00e-02$	$4.143e-04$	1.8	$9.710e-02$	$4.143e-04$	1.8	$9.710e-02$
40	$2.50e-02$	$1.156e-04$	1.8	$1.030e-01$	$1.156e-04$	1.8	$1.030e-01$
80	$1.25e-02$	$3.191e-05$	1.9	$1.092e-01$	$3.191e-05$	1.9	$1.092e-01$
160	$6.25e-03$	$8.730e-06$	1.9	$1.155e-01$	$8.730e-06$	1.9	$1.155e-01$
320	$3.13e-03$	$2.370e-06$	1.9	$1.220e-01$	$2.370e-06$	1.9	$1.220e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.725e-04$			$1.725e-04$		
20	$5.00e-02$	$4.311e-05$	2.0	$1.726e-02$	$4.311e-05$	2.0	$1.726e-02$
40	$2.50e-02$	$1.078e-05$	2.0	$1.725e-02$	$1.078e-05$	2.0	$1.725e-02$
80	$1.25e-02$	$2.695e-06$	2.0	$1.723e-02$	$2.695e-06$	2.0	$1.723e-02$
160	$6.25e-03$	$6.736e-07$	2.0	$1.725e-02$	$6.736e-07$	2.0	$1.725e-02$
320	$3.13e-03$	$1.684e-07$	2.0	$1.724e-02$	$1.684e-07$	2.0	$1.724e-02$

Table 78: Numerical experiment `ewa131` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.995e-05$			$5.995e-05$		
20	$5.00e-02$	$1.493e-05$	2.0	$6.079e-03$	$1.493e-05$	2.0	$6.079e-03$
40	$2.50e-02$	$3.726e-06$	2.0	$6.004e-03$	$3.726e-06$	2.0	$6.004e-03$
80	$1.25e-02$	$9.312e-07$	2.0	$5.975e-03$	$9.312e-07$	2.0	$5.975e-03$
160	$6.25e-03$	$2.328e-07$	2.0	$5.969e-03$	$2.328e-07$	2.0	$5.969e-03$
320	$3.13e-03$	$5.818e-08$	2.0	$5.968e-03$	$5.818e-08$	2.0	$5.968e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.807e-07$			$9.807e-07$		
20	$5.00e-02$	$6.552e-08$	3.9	$7.859e-03$	$6.552e-08$	3.9	$7.859e-03$
40	$2.50e-02$	$4.233e-09$	4.0	$9.087e-03$	$4.233e-09$	4.0	$9.087e-03$
80	$1.25e-02$	$2.681e-10$	4.0	$1.009e-02$	$2.681e-10$	4.0	$1.009e-02$
160	$6.25e-03$	$1.369e-11$	4.3	$3.941e-02$	$1.369e-11$	4.3	$3.941e-02$
320	$3.13e-03$	$5.975e-11$	-2.1	$2.826e-16$	$5.975e-11$	-2.1	$2.826e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.396e-04$			$3.396e-04$		
20	$5.00e-02$	$8.497e-05$	2.0	$3.387e-02$	$8.497e-05$	2.0	$3.387e-02$
40	$2.50e-02$	$2.125e-05$	2.0	$3.396e-02$	$2.125e-05$	2.0	$3.396e-02$
80	$1.25e-02$	$5.312e-06$	2.0	$3.399e-02$	$5.312e-06$	2.0	$3.399e-02$
160	$6.25e-03$	$1.328e-06$	2.0	$3.400e-02$	$1.328e-06$	2.0	$3.400e-02$
320	$3.13e-03$	$3.320e-07$	2.0	$3.403e-02$	$3.320e-07$	2.0	$3.403e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.132e-07$			$5.132e-07$		
20	$5.00e-02$	$3.389e-08$	3.9	$4.278e-03$	$3.389e-08$	3.9	$4.278e-03$
40	$2.50e-02$	$2.176e-09$	4.0	$4.821e-03$	$2.176e-09$	4.0	$4.821e-03$
80	$1.25e-02$	$1.376e-10$	4.0	$5.237e-03$	$1.376e-10$	4.0	$5.237e-03$
160	$6.25e-03$	$5.950e-12$	4.5	$5.784e-02$	$5.950e-12$	4.5	$5.784e-02$
320	$3.13e-03$	$4.398e-12$	0.4	$5.437e-11$	$4.398e-12$	0.4	$5.437e-11$

Table 79: Numerical experiment `ewa131` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.515e-08$			$6.515e-08$		
20	$5.00e-02$	$4.544e-09$	3.8	$4.527e-04$	$4.544e-09$	3.8	$4.527e-04$
40	$2.50e-02$	$3.126e-10$	3.9	$4.803e-04$	$3.126e-10$	3.9	$4.803e-04$
80	$1.25e-02$	$1.753e-11$	4.2	$1.426e-03$	$1.800e-11$	4.1	$1.236e-03$
160	$6.25e-03$	$5.782e-11$	-1.7	$9.256e-15$	$5.782e-11$	-1.7	$1.127e-14$
320	$3.13e-03$	$6.328e-10$	-3.5	$1.424e-18$	$6.328e-10$	-3.5	$1.424e-18$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.309e-08$			$3.309e-08$		
20	$5.00e-02$	$2.067e-09$	4.0	$3.314e-04$	$2.067e-09$	4.0	$3.314e-04$
40	$2.50e-02$	$1.289e-10$	4.0	$3.345e-04$	$1.289e-10$	4.0	$3.345e-04$
80	$1.25e-02$	$8.498e-12$	3.9	$2.483e-04$	$8.498e-12$	3.9	$2.483e-04$
160	$6.25e-03$	$2.414e-11$	-1.5	$1.156e-14$	$2.414e-11$	-1.5	$1.156e-14$
320	$3.13e-03$	$3.482e-11$	-0.5	$1.650e-12$	$3.482e-11$	-0.5	$1.650e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.256e-07$			$2.256e-07$		
20	$5.00e-02$	$1.462e-08$	3.9	$2.000e-03$	$1.462e-08$	3.9	$2.000e-03$
40	$2.50e-02$	$9.446e-10$	4.0	$2.030e-03$	$9.446e-10$	4.0	$2.030e-03$
80	$1.25e-02$	$6.859e-11$	3.8	$1.089e-03$	$9.649e-11$	3.3	$1.770e-04$
160	$6.25e-03$	$2.050e-11$	1.7	$1.418e-07$	$2.050e-11$	2.2	$1.726e-06$
320	$3.13e-03$	$7.509e-12$	1.4	$3.206e-08$	$7.449e-10$	-5.2	$7.719e-23$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.252e-08$			$1.252e-08$		
20	$5.00e-02$	$7.816e-10$	4.0	$1.258e-04$	$7.816e-10$	4.0	$1.258e-04$
40	$2.50e-02$	$4.863e-11$	4.0	$1.275e-04$	$4.863e-11$	4.0	$1.275e-04$
80	$1.25e-02$	$2.835e-12$	4.1	$1.803e-04$	$2.835e-12$	4.1	$1.803e-04$
160	$6.25e-03$	$6.921e-13$	2.0	$2.107e-08$	$6.921e-13$	2.0	$2.107e-08$
320	$3.13e-03$	$1.223e-12$	-0.8	$1.071e-14$	$1.223e-12$	-0.8	$1.071e-14$

Table 80: Numerical experiment `ewa131` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.882e-09$			$6.882e-09$		
20	$5.00e-02$	$4.298e-10$	4.0	$6.896e-05$	$4.298e-10$	4.0	$6.896e-05$
40	$2.50e-02$	$2.114e-11$	4.3	$1.939e-04$	$2.114e-11$	4.3	$1.939e-04$
80	$1.25e-02$	$6.318e-11$	-1.6	$6.226e-14$	$6.318e-11$	-1.6	$6.226e-14$
160	$6.25e-03$	$7.117e-11$	-0.2	$2.976e-11$	$7.117e-11$	-0.2	$2.976e-11$
320	$3.13e-03$	$1.935e-10$	-1.4	$4.698e-14$	$1.935e-10$	-1.4	$4.698e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.175e-11$			$7.175e-11$		
20	$5.00e-02$	$2.923e-12$	4.6	$2.975e-06$	$2.923e-12$	4.6	$2.975e-06$
40	$2.50e-02$	$5.816e-12$	-1.0	$1.494e-13$	$5.816e-12$	-1.0	$1.494e-13$
80	$1.25e-02$	$3.546e-11$	-2.6	$3.856e-16$	$3.546e-11$	-2.6	$3.856e-16$
160	$6.25e-03$	$3.570e-11$	-0.0	$3.399e-11$	$3.570e-11$	-0.0	$3.399e-11$
320	$3.13e-03$	$8.594e-11$	-1.3	$5.738e-14$	$8.594e-11$	-1.3	$5.738e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.751e-08$			$3.751e-08$		
20	$5.00e-02$	$2.348e-09$	4.0	$3.734e-04$	$2.348e-09$	4.0	$3.734e-04$
40	$2.50e-02$	$1.290e-10$	4.2	$6.556e-04$	$1.290e-10$	4.2	$6.556e-04$
80	$1.25e-02$	$2.812e-11$	2.2	$4.278e-07$	$4.455e-11$	1.5	$3.699e-08$
160	$6.25e-03$	$3.965e-10$	-3.8	$1.527e-18$	$3.965e-10$	-3.2	$4.432e-17$
320	$3.13e-03$	$5.191e-10$	-0.4	$5.514e-11$	$2.590e-09$	-2.7	$4.272e-16$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.777e-11$			$1.777e-11$		
20	$5.00e-02$	$3.216e-13$	5.8	$1.092e-05$	$3.216e-13$	5.8	$1.092e-05$
40	$2.50e-02$	$1.370e-13$	1.2	$1.285e-11$	$1.370e-13$	1.2	$1.285e-11$
80	$1.25e-02$	$1.388e-12$	-3.3	$6.096e-19$	$1.388e-12$	-3.3	$6.096e-19$
160	$6.25e-03$	$1.574e-11$	-3.5	$2.987e-19$	$1.574e-11$	-3.5	$2.987e-19$
320	$3.13e-03$	$3.307e-11$	-1.1	$6.853e-14$	$3.307e-11$	-1.1	$6.853e-14$

Table 81: Numerical experiment `ewa131` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$8.036e-003$		$8.055e-002$	$8.036e-003$		$8.055e-002$
20	$5.00e-002$	$4.015e-003$	1.0	$8.055e-002$	$4.015e-003$	1.0	$8.055e-002$
40	$2.50e-002$	$2.011e-003$	1.0	$7.980e-002$	$2.011e-003$	1.0	$7.980e-002$
80	$1.25e-002$	$1.005e-003$	1.0	$8.041e-002$	$1.005e-003$	1.0	$8.041e-002$
160	$6.25e-003$	$5.027e-004$	1.0	$8.041e-002$	$5.027e-004$	1.0	$8.041e-002$
320	$3.13e-003$	$2.513e-004$	1.0	$8.041e-002$	$2.513e-004$	1.0	$8.041e-002$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.187e-002$		$1.877e-001$	$1.187e-002$		$1.877e-001$
20	$5.00e-002$	$5.168e-003$	1.2	$1.877e-001$	$5.168e-003$	1.2	$1.877e-001$
40	$2.50e-002$	$2.395e-003$	1.1	$1.436e-001$	$2.395e-003$	1.1	$1.436e-001$
80	$1.25e-002$	$1.150e-003$	1.1	$1.186e-001$	$1.150e-003$	1.1	$1.186e-001$
160	$6.25e-003$	$5.635e-004$	1.0	$1.048e-001$	$5.635e-004$	1.0	$1.048e-001$
320	$3.13e-003$	$2.788e-004$	1.0	$9.733e-002$	$2.788e-004$	1.0	$9.733e-002$

Uniform Mesh		**Error for u at Grid tau**			**Error for u at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.764e-003$		$3.797e-001$	$3.764e-003$		$3.797e-001$
20	$5.00e-002$	$9.385e-004$	2.0	$3.797e-001$	$9.385e-004$	2.0	$3.797e-001$
40	$2.50e-002$	$2.344e-004$	2.0	$3.766e-001$	$2.344e-004$	2.0	$3.766e-001$
80	$1.25e-002$	$5.860e-005$	2.0	$3.755e-001$	$5.860e-005$	2.0	$3.755e-001$
160	$6.25e-003$	$1.465e-005$	2.0	$3.752e-001$	$1.465e-005$	2.0	$3.752e-001$
320	$3.13e-003$	$3.662e-006$	2.0	$3.750e-001$	$3.662e-006$	2.0	$3.750e-001$

Table 82: Numerical experiment `ewa131bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.694e-004$		$3.670e-002$	$3.694e-004$		$3.670e-002$
20	$5.00e-002$	$9.253e-005$	2.0	$3.670e-002$	$9.253e-005$	2.0	$3.670e-002$
40	$2.50e-002$	$2.314e-005$	2.0	$3.694e-002$	$2.314e-005$	2.0	$3.694e-002$
80	$1.25e-002$	$5.787e-006$	2.0	$3.701e-002$	$5.787e-006$	2.0	$3.701e-002$
160	$6.25e-003$	$1.447e-006$	2.0	$3.703e-002$	$1.447e-006$	2.0	$3.703e-002$
320	$3.13e-003$	$3.617e-007$	2.0	$3.703e-002$	$3.617e-007$	2.0	$3.703e-002$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.443e-004$		$1.337e-002$	$7.991e-004$		$3.887e-002$
20	$5.00e-002$	$1.594e-004$	1.5	$1.337e-002$	$2.482e-004$	1.7	$1.337e-002$
40	$2.50e-002$	$5.191e-005$	1.6	$2.036e-002$	$7.409e-005$	1.7	$2.036e-002$
80	$1.25e-002$	$1.599e-005$	1.7	$2.737e-002$	$2.153e-005$	1.8	$2.737e-002$
160	$6.25e-003$	$4.749e-006$	1.8	$3.439e-002$	$6.135e-006$	1.8	$3.439e-002$
320	$3.13e-003$	$1.375e-006$	1.8	$4.143e-002$	$1.722e-006$	1.8	$4.143e-002$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.649e-005$		$4.791e-003$	$4.873e-005$		$5.295e-003$
20	$5.00e-002$	$1.152e-005$	2.0	$4.791e-003$	$1.188e-005$	2.0	$4.791e-003$
40	$2.50e-002$	$2.873e-006$	2.0	$4.652e-003$	$2.924e-006$	2.0	$4.652e-003$
80	$1.25e-002$	$7.179e-007$	2.0	$4.606e-003$	$7.245e-007$	2.0	$4.606e-003$
160	$6.25e-003$	$1.795e-007$	2.0	$4.595e-003$	$1.803e-007$	2.0	$4.595e-003$
320	$3.13e-003$	$4.487e-008$	2.0	$4.596e-003$	$4.497e-008$	2.0	$4.596e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.770e-004$		$2.751e-002$	$2.770e-004$		$2.751e-002$
20	$5.00e-002$	$6.940e-005$	2.0	$2.751e-002$	$6.940e-005$	2.0	$2.751e-002$
40	$2.50e-002$	$1.736e-005$	2.0	$2.770e-002$	$1.736e-005$	2.0	$2.770e-002$
80	$1.25e-002$	$4.340e-006$	2.0	$2.775e-002$	$4.340e-006$	2.0	$2.775e-002$
160	$6.25e-003$	$1.085e-006$	2.0	$2.777e-002$	$1.085e-006$	2.0	$2.777e-002$
320	$3.13e-003$	$2.713e-007$	2.0	$2.778e-002$	$2.713e-007$	2.0	$2.778e-002$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.182e-004$		$7.195e-002$	$7.182e-004$		$7.195e-002$
20	$5.00e-002$	$1.794e-004$	2.0	$7.195e-002$	$1.794e-004$	2.0	$7.195e-002$
40	$2.50e-002$	$4.485e-005$	2.0	$7.183e-002$	$4.485e-005$	2.0	$7.183e-002$
80	$1.25e-002$	$1.121e-005$	2.0	$7.178e-002$	$1.121e-005$	2.0	$7.178e-002$
160	$6.25e-003$	$2.803e-006$	2.0	$7.177e-002$	$2.803e-006$	2.0	$7.177e-002$
320	$3.13e-003$	$7.008e-007$	2.0	$7.176e-002$	$7.008e-007$	2.0	$7.176e-002$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.785e-007$		$5.779e-003$	$6.772e-006$		$6.742e-003$
20	$5.00e-002$	$3.617e-008$	4.0	$5.779e-003$	$8.476e-007$	3.0	$5.779e-003$
40	$2.50e-002$	$2.261e-009$	4.0	$5.784e-003$	$1.058e-007$	3.0	$5.784e-003$
80	$1.25e-002$	$1.413e-010$	4.0	$5.786e-003$	$1.320e-008$	3.0	$5.786e-003$
160	$6.25e-003$	$8.830e-012$	4.0	$5.787e-003$	$1.649e-009$	3.0	$5.787e-003$
320	$3.13e-003$	$5.519e-013$	4.0	$5.785e-003$	$2.060e-010$	3.0	$5.785e-003$

Table 83: Numerical experiment `ewa131bvpsuite` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.498e-005$		$1.464e-002$	$1.498e-005$		$1.464e-002$
20	$5.00e-002$	$1.886e-006$	3.0	$1.464e-002$	$1.886e-006$	3.0	$1.464e-002$
40	$2.50e-002$	$2.364e-007$	3.0	$1.488e-002$	$2.364e-007$	3.0	$1.488e-002$
80	$1.25e-002$	$2.960e-008$	3.0	$1.501e-002$	$2.960e-008$	3.0	$1.501e-002$
160	$6.25e-003$	$3.703e-009$	3.0	$1.508e-002$	$3.703e-009$	3.0	$1.508e-002$
320	$3.13e-003$	$4.630e-010$	3.0	$1.513e-002$	$4.630e-010$	3.0	$1.513e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.329e-005$		$4.400e-003$	$4.329e-005$		$4.400e-003$
20	$5.00e-002$	$1.077e-005$	2.0	$4.400e-003$	$1.077e-005$	2.0	$4.400e-003$
40	$2.50e-002$	$2.688e-006$	2.0	$4.337e-003$	$2.688e-006$	2.0	$4.337e-003$
80	$1.25e-002$	$6.716e-007$	2.0	$4.312e-003$	$6.716e-007$	2.0	$4.312e-003$
160	$6.25e-003$	$1.679e-007$	2.0	$4.305e-003$	$1.679e-007$	2.0	$4.305e-003$
320	$3.13e-003$	$4.195e-008$	2.0	$4.312e-003$	$4.195e-008$	2.0	$4.312e-003$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.789e-007$		$1.785e-003$	$1.789e-007$		$1.785e-003$
20	$5.00e-002$	$1.119e-008$	4.0	$1.785e-003$	$1.119e-008$	4.0	$1.785e-003$
40	$2.50e-002$	$6.993e-010$	4.0	$1.789e-003$	$6.993e-010$	4.0	$1.789e-003$
80	$1.25e-002$	$4.371e-011$	4.0	$1.790e-003$	$4.371e-011$	4.0	$1.790e-003$
160	$6.25e-003$	$2.732e-012$	4.0	$1.790e-003$	$2.732e-012$	4.0	$1.790e-003$
320	$3.13e-003$	$1.708e-013$	4.0	$1.787e-003$	$1.708e-013$	4.0	$1.787e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.989e-006$		$7.805e-003$	$7.989e-006$		$7.805e-003$
20	$5.00e-002$	$1.006e-006$	3.0	$7.805e-003$	$1.006e-006$	3.0	$7.805e-003$
40	$2.50e-002$	$1.261e-007$	3.0	$7.935e-003$	$1.261e-007$	3.0	$7.935e-003$
80	$1.25e-002$	$1.579e-008$	3.0	$8.006e-003$	$1.579e-008$	3.0	$8.006e-003$
160	$6.25e-003$	$1.975e-009$	3.0	$8.045e-003$	$1.975e-009$	3.0	$8.045e-003$
320	$3.13e-003$	$2.469e-010$	3.0	$8.067e-003$	$2.469e-010$	3.0	$8.067e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.989e-004$		$2.980e-002$	$2.989e-004$		$2.980e-002$
20	$5.00e-002$	$7.479e-005$	2.0	$2.980e-002$	$7.479e-005$	2.0	$2.980e-002$
40	$2.50e-002$	$1.870e-005$	2.0	$2.989e-002$	$1.870e-005$	2.0	$2.989e-002$
80	$1.25e-002$	$4.676e-006$	2.0	$2.991e-002$	$4.676e-006$	2.0	$2.991e-002$
160	$6.25e-003$	$1.169e-006$	2.0	$2.993e-002$	$1.169e-006$	2.0	$2.993e-002$
320	$3.13e-003$	$2.922e-007$	2.0	$2.995e-002$	$2.922e-007$	2.0	$2.995e-002$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$8.325e-008$		$8.304e-004$	$8.325e-008$		$8.304e-004$
20	$5.00e-002$	$5.207e-009$	4.0	$8.304e-004$	$5.207e-009$	4.0	$8.304e-004$
40	$2.50e-002$	$3.255e-010$	4.0	$8.324e-004$	$3.255e-010$	4.0	$8.324e-004$
80	$1.25e-002$	$2.034e-011$	4.0	$8.331e-004$	$2.034e-011$	4.0	$8.331e-004$
160	$6.25e-003$	$1.272e-012$	4.0	$8.333e-004$	$1.272e-012$	4.0	$8.333e-004$
320	$3.13e-003$	$7.942e-014$	4.0	$8.374e-004$	$7.942e-014$	4.0	$8.374e-004$

Table 84: Numerical experiment `ewa131bvpsuite` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.130e-007$		$2.122e-003$	$2.130e-007$		$2.122e-003$
20	$5.00e-002$	$1.333e-008$	4.0	$2.122e-003$	$1.333e-008$	4.0	$2.122e-003$
40	$2.50e-002$	$8.333e-010$	4.0	$2.130e-003$	$8.333e-010$	4.0	$2.130e-003$
80	$1.25e-002$	$5.208e-011$	4.0	$2.132e-003$	$5.208e-011$	4.0	$2.132e-003$
160	$6.25e-003$	$3.255e-012$	4.0	$2.133e-003$	$3.255e-012$	4.0	$2.133e-003$
320	$3.13e-003$	$2.038e-013$	4.0	$2.103e-003$	$2.038e-013$	4.0	$2.103e-003$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.596e-008$		$1.852e-005$	$5.998e-008$		$2.894e-004$
20	$5.00e-002$	$1.908e-009$	3.1	$1.852e-005$	$4.669e-009$	3.7	$1.852e-005$
40	$2.50e-002$	$1.763e-010$	3.4	$5.632e-005$	$3.491e-010$	3.7	$5.632e-005$
80	$1.25e-002$	$1.798e-011$	3.3	$3.339e-005$	$2.650e-011$	3.7	$3.339e-005$
160	$6.25e-003$	$2.258e-011$	-0.3	$4.260e-012$	$4.990e-011$	-0.9	$4.260e-012$
320	$3.13e-003$	$4.816e-010$	-4.4	$4.193e-021$	$4.816e-010$	-3.3	$4.193e-021$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.533e-009$		$3.640e-005$	$3.847e-009$		$4.462e-005$
20	$5.00e-002$	$2.188e-010$	4.0	$3.640e-005$	$2.299e-010$	4.1	$3.640e-005$
40	$2.50e-002$	$1.365e-011$	4.0	$3.534e-005$	$1.401e-011$	4.0	$3.534e-005$
80	$1.25e-002$	$8.534e-013$	4.0	$3.482e-005$	$8.650e-013$	4.0	$3.482e-005$
160	$6.25e-003$	$5.462e-014$	4.0	$3.008e-005$	$5.507e-014$	4.0	$3.008e-005$
320	$3.13e-003$	$4.885e-015$	3.5	$2.597e-006$	$4.996e-015$	3.5	$2.597e-006$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.924e-008$		$7.893e-004$	$7.924e-008$		$7.893e-004$
20	$5.00e-002$	$4.958e-009$	4.0	$7.893e-004$	$4.958e-009$	4.0	$7.893e-004$
40	$2.50e-002$	$3.100e-010$	4.0	$7.923e-004$	$3.100e-010$	4.0	$7.923e-004$
80	$1.25e-002$	$1.938e-011$	4.0	$7.933e-004$	$1.938e-011$	4.0	$7.933e-004$
160	$6.25e-003$	$1.211e-012$	4.0	$7.934e-004$	$1.211e-012$	4.0	$7.934e-004$
320	$3.13e-003$	$7.579e-014$	4.0	$7.863e-004$	$7.579e-014$	4.0	$7.863e-004$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.847e-007$		$1.844e-003$	$1.847e-007$		$1.844e-003$
20	$5.00e-002$	$1.155e-008$	4.0	$1.844e-003$	$1.155e-008$	4.0	$1.844e-003$
40	$2.50e-002$	$7.202e-010$	4.0	$1.866e-003$	$7.202e-010$	4.0	$1.866e-003$
80	$1.25e-002$	$5.285e-011$	3.8	$7.846e-004$	$9.367e-011$	2.9	$7.846e-004$
160	$6.25e-003$	$2.215e-011$	1.3	$1.290e-008$	$2.215e-011$	2.1	$1.290e-008$
320	$3.13e-003$	$7.698e-012$	1.5	$5.088e-008$	$7.460e-010$	-5.1	$5.088e-008$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.719e-011$		$1.716e-005$	$2.009e-010$		$1.918e-005$
20	$5.00e-002$	$2.687e-013$	6.0	$1.716e-005$	$6.366e-012$	5.0	$1.716e-005$
40	$2.50e-002$	$4.148e-015$	6.0	$1.811e-005$	$2.005e-013$	5.0	$1.811e-005$
80	$1.25e-002$	$5.551e-016$	2.9	$1.847e-010$	$6.661e-015$	4.9	$1.847e-010$
160	$6.25e-003$	$6.661e-016$	-0.3	$1.753e-016$	$8.882e-016$	2.9	$1.753e-016$
320	$3.13e-003$	$6.661e-016$	0.0	$6.661e-016$	$8.882e-016$	0.0	$6.661e-016$

Table 85: Numerical experiment `ewa131bvpsuite` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.283e-009$		$2.202e-004$	$2.283e-009$		$2.202e-004$
20	$5.00e-002$	$7.214e-011$	5.0	$2.202e-004$	$7.214e-011$	5.0	$2.202e-004$
40	$2.50e-002$	$2.274e-012$	5.0	$2.222e-004$	$2.274e-012$	5.0	$2.222e-004$
80	$1.25e-002$	$7.716e-014$	4.9	$1.503e-004$	$7.716e-014$	4.9	$1.503e-004$
160	$6.25e-003$	$1.166e-014$	2.7	$1.192e-008$	$1.166e-014$	2.7	$1.192e-008$
320	$3.13e-003$	$7.550e-015$	0.6	$2.806e-013$	$1.237e-014$	-0.1	$2.806e-013$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.401e-009$		$5.351e-005$	$5.401e-009$		$5.351e-005$
20	$5.00e-002$	$3.385e-010$	4.0	$5.351e-005$	$3.385e-010$	4.0	$5.351e-005$
40	$2.50e-002$	$1.852e-011$	4.2	$9.637e-005$	$1.852e-011$	4.2	$9.637e-005$
80	$1.25e-002$	$5.753e-011$	-1.6	$4.439e-014$	$5.753e-011$	-1.6	$4.439e-014$
160	$6.25e-003$	$2.402e-011$	1.3	$1.438e-008$	$3.520e-011$	0.7	$1.438e-008$
320	$3.13e-003$	$1.004e-010$	-2.1	$6.798e-016$	$1.004e-010$	-1.5	$6.798e-016$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$8.692e-012$		$8.618e-006$	$8.692e-012$		$8.618e-006$
20	$5.00e-002$	$1.362e-013$	6.0	$8.618e-006$	$1.362e-013$	6.0	$8.618e-006$
40	$2.50e-002$	$2.187e-015$	6.0	$7.730e-006$	$2.554e-015$	5.7	$7.730e-006$
80	$1.25e-002$	$1.332e-015$	0.7	$3.059e-014$	$1.721e-015$	0.6	$3.059e-014$
160	$6.25e-003$	$2.054e-015$	-0.6	$8.632e-017$	$2.109e-015$	-0.3	$8.632e-017$
320	$3.13e-003$	$1.887e-015$	0.1	$3.815e-015$	$2.109e-015$	0.0	$3.815e-015$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa131	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.871e-010$		$5.664e-005$	$5.871e-010$		$5.664e-005$
20	$5.00e-002$	$1.855e-011$	5.0	$5.664e-005$	$1.855e-011$	5.0	$5.664e-005$
40	$2.50e-002$	$5.820e-013$	5.0	$5.827e-005$	$5.820e-013$	5.0	$5.827e-005$
80	$1.25e-002$	$1.832e-014$	5.0	$5.736e-005$	$1.832e-014$	5.0	$5.736e-005$
160	$6.25e-003$	$9.159e-016$	4.3	$3.075e-006$	$1.679e-015$	3.4	$3.075e-006$
320	$3.13e-003$	$1.027e-015$	-0.2	$3.963e-016$	$1.707e-015$	-0.0	$3.963e-016$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.539e-008$		$3.524e-004$	$3.539e-008$		$3.524e-004$
20	$5.00e-002$	$2.215e-009$	4.0	$3.524e-004$	$2.215e-009$	4.0	$3.524e-004$
40	$2.50e-002$	$1.215e-010$	4.2	$6.228e-004$	$1.230e-010$	4.2	$6.228e-004$
80	$1.25e-002$	$2.667e-011$	2.2	$3.879e-007$	$4.393e-011$	1.5	$3.879e-007$
160	$6.25e-003$	$3.635e-010$	-3.8	$1.798e-018$	$3.635e-010$	-3.0	$1.798e-018$
320	$3.13e-003$	$4.838e-010$	-0.4	$4.480e-011$	$2.573e-009$	-2.8	$4.480e-011$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.573e-012$		$1.552e-006$	$1.573e-012$		$1.552e-006$
20	$5.00e-002$	$2.468e-014$	6.0	$1.552e-006$	$2.468e-014$	6.0	$1.552e-006$
40	$2.50e-002$	$9.992e-016$	4.6	$2.577e-008$	$1.332e-015$	4.2	$2.577e-008$
80	$1.25e-002$	$9.992e-016$	0.0	$9.992e-016$	$1.221e-015$	0.1	$9.992e-016$
160	$6.25e-003$	$1.554e-015$	-0.6	$6.117e-017$	$1.665e-015$	-0.4	$6.117e-017$
320	$3.13e-003$	$8.882e-016$	0.8	$9.355e-014$	$9.992e-016$	0.7	$9.355e-014$

Table 86: Numerical experiment `ewa131bvpsuite` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.545e-02$			$1.545e-02$		
20	$5.00e-02$	$3.993e-03$	2.0	$1.383e+00$	$3.993e-03$	2.0	$1.383e+00$
40	$2.50e-02$	$1.033e-03$	1.9	$1.375e+00$	$1.033e-03$	1.9	$1.375e+00$
80	$1.25e-02$	$2.673e-04$	2.0	$1.379e+00$	$2.673e-04$	2.0	$1.379e+00$
160	$6.25e-03$	$6.908e-05$	2.0	$1.387e+00$	$6.908e-05$	2.0	$1.387e+00$
320	$3.13e-03$	$1.783e-05$	2.0	$1.398e+00$	$1.783e-05$	2.0	$1.398e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.129e-02$			$1.129e-02$		
20	$5.00e-02$	$3.101e-03$	1.9	$8.268e-01$	$3.101e-03$	1.9	$8.268e-01$
40	$2.50e-02$	$8.121e-04$	1.9	$1.016e+00$	$8.121e-04$	1.9	$1.016e+00$
80	$1.25e-02$	$2.077e-04$	2.0	$1.150e+00$	$2.077e-04$	2.0	$1.150e+00$
160	$6.25e-03$	$5.254e-05$	2.0	$1.237e+00$	$5.254e-05$	2.0	$1.237e+00$
320	$3.13e-03$	$1.321e-05$	2.0	$1.290e+00$	$1.321e-05$	2.0	$1.290e+00$

Table 87: Numerical experiment `maerz131` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.438e-04$			$7.983e-04$		
20	$5.00e-02$	$1.770e-04$	1.9	$4.697e-02$	$2.481e-04$	1.7	$3.874e-02$
40	$2.50e-02$	$4.825e-05$	1.9	$4.865e-02$	$7.409e-05$	1.7	$4.605e-02$
80	$1.25e-02$	$1.307e-05$	1.9	$5.048e-02$	$2.153e-05$	1.8	$5.319e-02$
160	$6.25e-03$	$3.517e-06$	1.9	$5.240e-02$	$6.135e-06$	1.8	$6.028e-02$
320	$3.13e-03$	$9.420e-07$	1.9	$5.438e-02$	$1.722e-06$	1.8	$6.736e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.189e-05$			$4.850e-05$		
20	$5.00e-02$	$3.012e-06$	2.0	$1.139e-03$	$1.187e-05$	2.0	$5.209e-03$
40	$2.50e-02$	$7.532e-07$	2.0	$1.203e-03$	$2.923e-06$	2.0	$5.063e-03$
80	$1.25e-02$	$1.883e-07$	2.0	$1.205e-03$	$7.244e-07$	2.0	$4.896e-03$
160	$6.25e-03$	$4.708e-08$	2.0	$1.205e-03$	$1.803e-07$	2.0	$4.770e-03$
320	$3.13e-03$	$1.177e-08$	2.0	$1.205e-03$	$4.497e-08$	2.0	$4.693e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.624e-03$			$1.624e-03$		
20	$5.00e-02$	$4.541e-04$	1.8	$1.119e-01$	$4.541e-04$	1.8	$1.119e-01$
40	$2.50e-02$	$1.256e-04$	1.9	$1.175e-01$	$1.256e-04$	1.9	$1.175e-01$
80	$1.25e-02$	$3.440e-05$	1.9	$1.234e-01$	$3.440e-05$	1.9	$1.234e-01$
160	$6.25e-03$	$9.353e-06$	1.9	$1.296e-01$	$9.353e-06$	1.9	$1.296e-01$
320	$3.13e-03$	$2.526e-06$	1.9	$1.359e-01$	$2.526e-06$	1.9	$1.359e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.337e-05$			$4.337e-05$		
20	$5.00e-02$	$1.084e-05$	2.0	$4.334e-03$	$1.084e-05$	2.0	$4.334e-03$
40	$2.50e-02$	$2.714e-06$	2.0	$4.320e-03$	$2.714e-06$	2.0	$4.320e-03$
80	$1.25e-02$	$6.787e-07$	2.0	$4.332e-03$	$6.787e-07$	2.0	$4.332e-03$
160	$6.25e-03$	$1.697e-07$	2.0	$4.343e-03$	$1.697e-07$	2.0	$4.343e-03$
320	$3.13e-03$	$4.242e-08$	2.0	$4.342e-03$	$4.242e-08$	2.0	$4.342e-03$

Table 88: Numerical experiment `maerz131` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.015e-05$			$6.015e-05$		
20	$5.00e-02$	$1.494e-05$	2.0	$6.151e-03$	$1.494e-05$	2.0	$6.151e-03$
40	$2.50e-02$	$3.727e-06$	2.0	$6.026e-03$	$3.727e-06$	2.0	$6.026e-03$
80	$1.25e-02$	$9.313e-07$	2.0	$5.981e-03$	$9.313e-07$	2.0	$5.981e-03$
160	$6.25e-03$	$2.328e-07$	2.0	$5.971e-03$	$2.328e-07$	2.0	$5.971e-03$
320	$3.13e-03$	$5.814e-08$	2.0	$5.996e-03$	$5.814e-08$	2.0	$5.996e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.915e-07$			$6.915e-07$		
20	$5.00e-02$	$4.396e-08$	4.0	$6.534e-03$	$4.396e-08$	4.0	$6.534e-03$
40	$2.50e-02$	$2.771e-09$	4.0	$6.781e-03$	$2.771e-09$	4.0	$6.781e-03$
80	$1.25e-02$	$1.739e-10$	4.0	$6.935e-03$	$1.739e-10$	4.0	$6.935e-03$
160	$6.25e-03$	$1.091e-11$	4.0	$6.968e-03$	$1.091e-11$	4.0	$6.968e-03$
320	$3.13e-03$	$2.704e-12$	2.0	$2.977e-07$	$2.704e-12$	2.0	$2.977e-07$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.397e-04$			$3.397e-04$		
20	$5.00e-02$	$8.498e-05$	2.0	$3.390e-02$	$8.498e-05$	2.0	$3.390e-02$
40	$2.50e-02$	$2.125e-05$	2.0	$3.397e-02$	$2.125e-05$	2.0	$3.397e-02$
80	$1.25e-02$	$5.312e-06$	2.0	$3.399e-02$	$5.312e-06$	2.0	$3.399e-02$
160	$6.25e-03$	$1.328e-06$	2.0	$3.400e-02$	$1.328e-06$	2.0	$3.400e-02$
320	$3.13e-03$	$3.320e-07$	2.0	$3.403e-02$	$3.320e-07$	2.0	$3.403e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.754e-07$			$3.754e-07$		
20	$5.00e-02$	$2.364e-08$	4.0	$3.658e-03$	$2.364e-08$	4.0	$3.658e-03$
40	$2.50e-02$	$1.485e-09$	4.0	$3.706e-03$	$1.485e-09$	4.0	$3.706e-03$
80	$1.25e-02$	$9.302e-11$	4.0	$3.751e-03$	$9.302e-11$	4.0	$3.751e-03$
160	$6.25e-03$	$5.820e-12$	4.0	$3.784e-03$	$5.820e-12$	4.0	$3.784e-03$
320	$3.13e-03$	$1.071e-12$	2.4	$1.403e-06$	$1.071e-12$	2.4	$1.403e-06$

Table 89: Numerical experiment `maerz131` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.825e-08$			$9.825e-08$		
20	$5.00e-02$	$6.611e-09$	3.9	$7.688e-04$	$6.611e-09$	3.9	$7.688e-04$
40	$2.50e-02$	$4.416e-10$	3.9	$7.931e-04$	$4.416e-10$	3.9	$7.931e-04$
80	$1.25e-02$	$2.506e-11$	4.1	$1.892e-03$	$2.658e-11$	4.1	$1.383e-03$
160	$6.25e-03$	$2.645e-11$	-0.1	$1.780e-11$	$4.968e-11$	-0.9	$5.095e-13$
320	$3.13e-03$	$6.266e-10$	-4.6	$2.278e-21$	$6.266e-10$	-3.7	$4.321e-19$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.148e-09$			$3.827e-09$		
20	$5.00e-02$	$7.166e-11$	4.0	$1.152e-05$	$2.296e-10$	4.1	$4.385e-05$
40	$2.50e-02$	$4.620e-12$	4.0	$1.003e-05$	$1.401e-11$	4.0	$4.075e-05$
80	$1.25e-02$	$3.615e-13$	3.7	$3.577e-06$	$8.861e-13$	4.0	$3.369e-05$
160	$6.25e-03$	$1.874e-12$	-2.4	$1.098e-17$	$1.874e-12$	-1.1	$7.789e-15$
320	$3.13e-03$	$1.321e-11$	-2.8	$1.151e-18$	$1.321e-11$	-2.8	$1.151e-18$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.380e-07$			$2.380e-07$		
20	$5.00e-02$	$1.539e-08$	4.0	$2.122e-03$	$1.539e-08$	4.0	$2.122e-03$
40	$2.50e-02$	$9.924e-10$	4.0	$2.155e-03$	$9.924e-10$	4.0	$2.155e-03$
80	$1.25e-02$	$7.154e-11$	3.8	$1.189e-03$	$9.371e-11$	3.4	$2.826e-04$
160	$6.25e-03$	$2.104e-11$	1.8	$1.639e-07$	$2.104e-11$	2.2	$1.183e-06$
320	$3.13e-03$	$8.712e-12$	1.3	$1.339e-08$	$7.460e-10$	-5.1	$9.471e-23$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.718e-09$			$1.718e-09$		
20	$5.00e-02$	$1.071e-10$	4.0	$1.733e-05$	$1.071e-10$	4.0	$1.733e-05$
40	$2.50e-02$	$6.722e-12$	4.0	$1.681e-05$	$6.722e-12$	4.0	$1.681e-05$
80	$1.25e-02$	$4.887e-13$	3.8	$7.691e-06$	$4.887e-13$	3.8	$7.691e-06$
160	$6.25e-03$	$2.952e-13$	0.7	$1.185e-11$	$2.952e-13$	0.7	$1.185e-11$
320	$3.13e-03$	$1.866e-12$	-2.7	$4.041e-19$	$1.866e-12$	-2.7	$4.041e-19$

Table 90: Numerical experiment `maerz131` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.897e-09$			$6.897e-09$		
20	$5.00e-02$	$4.313e-10$	4.0	$6.887e-05$	$4.313e-10$	4.0	$6.887e-05$
40	$2.50e-02$	$2.478e-11$	4.1	$9.929e-05$	$2.478e-11$	4.1	$9.929e-05$
80	$1.25e-02$	$7.871e-11$	-1.7	$5.282e-14$	$7.871e-11$	-1.7	$5.282e-14$
160	$6.25e-03$	$6.322e-11$	0.3	$3.146e-10$	$6.322e-11$	0.3	$3.146e-10$
320	$3.13e-03$	$1.052e-10$	-0.7	$1.517e-12$	$1.052e-10$	-0.7	$1.517e-12$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.331e-11$			$5.331e-11$		
20	$5.00e-02$	$8.369e-13$	6.0	$5.248e-05$	$8.369e-13$	6.0	$5.248e-05$
40	$2.50e-02$	$1.835e-13$	2.2	$5.901e-10$	$1.835e-13$	2.2	$5.901e-10$
80	$1.25e-02$	$9.848e-13$	-2.4	$2.402e-17$	$9.848e-13$	-2.4	$2.402e-17$
160	$6.25e-03$	$5.380e-12$	-2.4	$2.145e-17$	$5.380e-12$	-2.4	$2.145e-17$
320	$3.13e-03$	$5.796e-12$	-0.1	$3.117e-12$	$5.796e-12$	-0.1	$3.117e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
maerz131	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.752e-08$			$3.752e-08$		
20	$5.00e-02$	$2.348e-09$	4.0	$3.737e-04$	$2.348e-09$	4.0	$3.737e-04$
40	$2.50e-02$	$1.291e-10$	4.2	$6.539e-04$	$1.291e-10$	4.2	$6.539e-04$
80	$1.25e-02$	$2.788e-11$	2.2	$4.491e-07$	$4.383e-11$	1.6	$4.044e-08$
160	$6.25e-03$	$3.873e-10$	-3.8	$1.666e-18$	$3.873e-10$	-3.1	$4.571e-17$
320	$3.13e-03$	$5.036e-10$	-0.4	$5.660e-11$	$2.573e-09$	-2.7	$3.680e-16$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.519e-11$			$1.519e-11$		
20	$5.00e-02$	$2.401e-13$	6.0	$1.460e-05$	$2.401e-13$	6.0	$1.460e-05$
40	$2.50e-02$	$2.087e-14$	3.5	$9.230e-09$	$2.087e-14$	3.5	$9.230e-09$
80	$1.25e-02$	$1.755e-13$	-3.1	$2.500e-19$	$1.755e-13$	-3.1	$2.500e-19$
160	$6.25e-03$	$1.403e-12$	-3.0	$3.442e-19$	$1.403e-12$	-3.0	$3.442e-19$
320	$3.13e-03$	$2.386e-12$	-0.8	$2.879e-14$	$2.386e-12$	-0.8	$2.879e-14$

Table 91: Numerical experiment `maerz131` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.006e-02$			$3.006e-02$		
20	$5.00e-02$	$1.440e-02$	1.1	$3.468e-01$	$1.440e-02$	1.1	$3.468e-01$
40	$2.50e-02$	$7.031e-03$	1.0	$3.187e-01$	$7.031e-03$	1.0	$3.187e-01$
80	$1.25e-02$	$3.473e-03$	1.0	$3.002e-01$	$3.473e-03$	1.0	$3.002e-01$
160	$6.25e-03$	$1.725e-03$	1.0	$2.890e-01$	$1.725e-03$	1.0	$2.890e-01$
320	$3.13e-03$	$8.600e-04$	1.0	$2.825e-01$	$8.600e-04$	1.0	$2.825e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.758e-03$			$1.758e-03$		
20	$5.00e-02$	$5.297e-04$	1.7	$9.452e-02$	$5.297e-04$	1.7	$9.452e-02$
40	$2.50e-02$	$1.508e-04$	1.8	$1.208e-01$	$1.508e-04$	1.8	$1.208e-01$
80	$1.25e-02$	$4.021e-05$	1.9	$1.714e-01$	$4.021e-05$	1.9	$1.714e-01$
160	$6.25e-03$	$1.038e-05$	2.0	$2.102e-01$	$1.038e-05$	2.0	$2.102e-01$
320	$3.13e-03$	$2.637e-06$	2.0	$2.364e-01$	$2.637e-06$	2.0	$2.364e-01$

Table 92: Numerical experiment `ewa141` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.261e-02$			$1.261e-02$		
20	$5.00e-02$	$6.362e-03$	1.0	$1.224e-01$	$6.362e-03$	1.0	$1.224e-01$
40	$2.50e-02$	$3.211e-03$	1.0	$1.222e-01$	$3.211e-03$	1.0	$1.222e-01$
80	$1.25e-02$	$1.617e-03$	1.0	$1.236e-01$	$1.617e-03$	1.0	$1.236e-01$
160	$6.25e-03$	$8.123e-04$	1.0	$1.255e-01$	$8.123e-04$	1.0	$1.255e-01$
320	$3.13e-03$	$4.074e-04$	1.0	$1.271e-01$	$4.074e-04$	1.0	$1.271e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.300e-04$			$4.300e-04$		
20	$5.00e-02$	$1.366e-04$	1.7	$1.937e-02$	$1.366e-04$	1.7	$1.937e-02$
40	$2.50e-02$	$3.845e-05$	1.8	$3.278e-02$	$3.845e-05$	1.8	$3.278e-02$
80	$1.25e-02$	$1.050e-05$	1.9	$3.851e-02$	$1.050e-05$	1.9	$3.851e-02$
160	$6.25e-03$	$2.777e-06$	1.9	$4.694e-02$	$2.777e-06$	1.9	$4.694e-02$
320	$3.13e-03$	$7.227e-07$	1.9	$5.303e-02$	$7.227e-07$	1.9	$5.303e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.182e-02$			$1.182e-02$		
20	$5.00e-02$	$5.955e-03$	1.0	$1.152e-01$	$5.955e-03$	1.0	$1.152e-01$
40	$2.50e-02$	$3.001e-03$	1.0	$1.152e-01$	$3.001e-03$	1.0	$1.152e-01$
80	$1.25e-02$	$1.509e-03$	1.0	$1.164e-01$	$1.509e-03$	1.0	$1.164e-01$
160	$6.25e-03$	$7.576e-04$	1.0	$1.178e-01$	$7.576e-04$	1.0	$1.178e-01$
320	$3.13e-03$	$3.797e-04$	1.0	$1.191e-01$	$3.797e-04$	1.0	$1.191e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.885e-04$			$3.885e-04$		
20	$5.00e-02$	$1.213e-04$	1.7	$1.856e-02$	$1.213e-04$	1.7	$1.856e-02$
40	$2.50e-02$	$3.384e-05$	1.8	$3.019e-02$	$3.384e-05$	1.8	$3.019e-02$
80	$1.25e-02$	$8.951e-06$	1.9	$4.012e-02$	$8.951e-06$	1.9	$4.012e-02$
160	$6.25e-03$	$2.305e-06$	2.0	$4.755e-02$	$2.305e-06$	2.0	$4.755e-02$
320	$3.13e-03$	$5.851e-07$	2.0	$5.267e-02$	$5.851e-07$	2.0	$5.267e-02$

Table 93: Numerical experiment `ewa141` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.846e-05$			$5.846e-05$		
20	$5.00e-02$	$7.177e-06$	3.0	$6.205e-02$	$7.177e-06$	3.0	$6.205e-02$
40	$2.50e-02$	$8.826e-07$	3.0	$6.163e-02$	$8.826e-07$	3.0	$6.163e-02$
80	$1.25e-02$	$1.093e-07$	3.0	$5.950e-02$	$1.093e-07$	3.0	$5.950e-02$
160	$6.25e-03$	$1.381e-08$	3.0	$5.208e-02$	$1.381e-08$	3.0	$5.208e-02$
320	$3.13e-03$	$1.105e-09$	3.6	$1.488e+00$	$1.105e-09$	3.6	$1.488e+00$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.610e-06$			$6.610e-06$		
20	$5.00e-02$	$4.703e-07$	3.8	$4.298e-02$	$4.703e-07$	3.8	$4.298e-02$
40	$2.50e-02$	$3.137e-08$	3.9	$5.680e-02$	$3.137e-08$	3.9	$5.680e-02$
80	$1.25e-02$	$2.025e-09$	4.0	$6.759e-02$	$2.025e-09$	4.0	$6.759e-02$
160	$6.25e-03$	$1.280e-10$	4.0	$7.714e-02$	$1.280e-10$	4.0	$7.714e-02$
320	$3.13e-03$	$8.898e-12$	3.8	$3.856e-02$	$8.898e-12$	3.8	$3.856e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.542e-05$			$4.542e-05$		
20	$5.00e-02$	$5.654e-06$	3.0	$4.604e-02$	$5.654e-06$	3.0	$4.604e-02$
40	$2.50e-02$	$7.005e-07$	3.0	$4.700e-02$	$7.005e-07$	3.0	$4.700e-02$
80	$1.25e-02$	$8.713e-08$	3.0	$4.605e-02$	$8.713e-08$	3.0	$4.605e-02$
160	$6.25e-03$	$1.115e-08$	3.0	$3.838e-02$	$1.115e-08$	3.0	$3.838e-02$
320	$3.13e-03$	$8.594e-09$	0.4	$7.523e-08$	$8.594e-09$	0.4	$7.523e-08$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.522e-06$			$3.522e-06$		
20	$5.00e-02$	$2.507e-07$	3.8	$2.287e-02$	$2.507e-07$	3.8	$2.287e-02$
40	$2.50e-02$	$1.672e-08$	3.9	$3.024e-02$	$1.672e-08$	3.9	$3.024e-02$
80	$1.25e-02$	$1.080e-09$	4.0	$3.605e-02$	$1.080e-09$	4.0	$3.605e-02$
160	$6.25e-03$	$6.805e-11$	4.0	$4.188e-02$	$6.805e-11$	4.0	$4.188e-02$
320	$3.13e-03$	$7.507e-12$	3.2	$6.962e-04$	$7.507e-12$	3.2	$6.962e-04$

Table 94: Numerical experiment `ewa141` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.295e-05$			$1.295e-05$		
20	$5.00e-02$	$1.568e-06$	3.0	$1.438e-02$	$1.568e-06$	3.0	$1.438e-02$
40	$2.50e-02$	$1.924e-07$	3.0	$1.360e-02$	$1.924e-07$	3.0	$1.360e-02$
80	$1.25e-02$	$2.422e-08$	3.0	$1.183e-02$	$2.422e-08$	3.0	$1.183e-02$
160	$6.25e-03$	$1.523e-10$	7.3	$2.009e+06$	$1.523e-10$	7.3	$2.009e+06$
320	$3.13e-03$	$1.880e-08$	-6.9	$7.394e-26$	$1.880e-08$	-6.9	$7.394e-26$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.084e-07$			$2.084e-07$		
20	$5.00e-02$	$1.399e-08$	3.9	$1.644e-03$	$1.399e-08$	3.9	$1.644e-03$
40	$2.50e-02$	$1.129e-09$	3.6	$7.420e-04$	$1.129e-09$	3.6	$7.420e-04$
80	$1.25e-02$	$8.086e-11$	3.8	$1.397e-03$	$8.086e-11$	3.8	$1.397e-03$
160	$6.25e-03$	$4.786e-12$	4.1	$4.673e-03$	$4.786e-12$	4.1	$4.673e-03$
320	$3.13e-03$	$1.801e-11$	-1.9	$2.918e-16$	$1.801e-11$	-1.9	$2.918e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.246e-06$			$8.246e-06$		
20	$5.00e-02$	$1.015e-06$	3.0	$8.681e-03$	$1.015e-06$	3.0	$8.681e-03$
40	$2.50e-02$	$1.256e-07$	3.0	$8.471e-03$	$1.256e-07$	3.0	$8.471e-03$
80	$1.25e-02$	$1.557e-08$	3.0	$8.403e-03$	$1.557e-08$	3.0	$8.403e-03$
160	$6.25e-03$	$2.689e-09$	2.5	$1.034e-03$	$2.689e-09$	2.5	$1.034e-03$
320	$3.13e-03$	$3.221e-09$	-0.3	$7.179e-10$	$3.221e-09$	-0.3	$7.179e-10$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.570e-08$			$7.570e-08$		
20	$5.00e-02$	$5.798e-09$	3.7	$3.852e-04$	$5.798e-09$	3.7	$3.852e-04$
40	$2.50e-02$	$4.574e-10$	3.7	$3.391e-04$	$4.574e-10$	3.7	$3.391e-04$
80	$1.25e-02$	$3.175e-11$	3.8	$6.703e-04$	$3.175e-11$	3.8	$6.703e-04$
160	$6.25e-03$	$2.943e-12$	3.4	$1.075e-04$	$2.943e-12$	3.4	$1.075e-04$
320	$3.13e-03$	$1.829e-12$	0.7	$9.598e-11$	$1.829e-12$	0.7	$9.598e-11$

Table 95: Numerical experiment `ewa141` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.703e-07$			$1.703e-07$		
20	$5.00e-02$	$5.397e-09$	5.0	$1.624e-02$	$5.397e-09$	5.0	$1.624e-02$
40	$2.50e-02$	$2.811e-10$	4.3	$1.899e-03$	$2.811e-10$	4.3	$1.899e-03$
80	$1.25e-02$	$1.484e-11$	4.2	$1.769e-03$	$1.484e-11$	4.2	$1.769e-03$
160	$6.25e-03$	$5.096e-09$	-8.4	$1.378e-27$	$5.096e-09$	-8.4	$1.378e-27$
320	$3.13e-03$	$1.100e-09$	2.2	$3.831e-04$	$1.100e-09$	2.2	$3.831e-04$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.693e-09$			$8.693e-09$		
20	$5.00e-02$	$1.682e-10$	5.7	$4.277e-03$	$1.682e-10$	5.7	$4.277e-03$
40	$2.50e-02$	$2.184e-12$	6.3	$2.394e-02$	$2.184e-12$	6.3	$2.394e-02$
80	$1.25e-02$	$2.709e-12$	-0.3	$6.932e-13$	$2.709e-12$	-0.3	$6.932e-13$
160	$6.25e-03$	$8.010e-12$	-1.6	$2.863e-15$	$8.010e-12$	-1.6	$2.863e-15$
320	$3.13e-03$	$1.224e-11$	-0.6	$3.590e-13$	$1.224e-11$	-0.6	$3.590e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.706e-08$			$8.706e-08$		
20	$5.00e-02$	$2.801e-09$	5.0	$7.899e-03$	$2.801e-09$	5.0	$7.899e-03$
40	$2.50e-02$	$5.546e-11$	5.7	$6.444e-02$	$5.546e-11$	5.7	$6.444e-02$
80	$1.25e-02$	$4.619e-10$	-3.1	$6.994e-16$	$4.619e-10$	-3.1	$6.994e-16$
160	$6.25e-03$	$1.024e-09$	-1.1	$3.021e-12$	$1.024e-09$	-1.1	$3.021e-12$
320	$3.13e-03$	$3.898e-09$	-1.9	$5.731e-14$	$3.898e-09$	-1.9	$5.731e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.232e-09$			$2.232e-09$		
20	$5.00e-02$	$4.315e-11$	5.7	$1.101e-03$	$4.315e-11$	5.7	$1.101e-03$
40	$2.50e-02$	$8.468e-13$	5.7	$1.032e-03$	$8.468e-13$	5.7	$1.032e-03$
80	$1.25e-02$	$7.189e-13$	0.2	$2.023e-12$	$7.189e-13$	0.2	$2.023e-12$
160	$6.25e-03$	$9.613e-13$	-0.4	$1.145e-13$	$9.613e-13$	-0.4	$1.145e-13$
320	$3.13e-03$	$2.354e-12$	-1.3	$1.365e-15$	$2.354e-12$	-1.3	$1.365e-15$

Table 96: Numerical experiment `ewa141` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.679e-002$		$4.190e-001$	$4.679e-002$		$4.190e-001$
20	$5.00e-002$	$2.418e-002$	1.0	$4.190e-001$	$2.418e-002$	1.0	$4.190e-001$
40	$2.50e-002$	$1.229e-002$	1.0	$4.501e-001$	$1.229e-002$	1.0	$4.501e-001$
80	$1.25e-002$	$6.198e-003$	1.0	$4.704e-001$	$6.198e-003$	1.0	$4.704e-001$
160	$6.25e-003$	$3.112e-003$	1.0	$4.830e-001$	$3.112e-003$	1.0	$4.830e-001$
320	$3.13e-003$	$1.559e-003$	1.0	$4.904e-001$	$1.559e-003$	1.0	$4.904e-001$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$8.846e-004$		$8.856e-002$	$8.846e-004$		$8.856e-002$
20	$5.00e-002$	$2.211e-004$	2.0	$8.856e-002$	$2.211e-004$	2.0	$8.856e-002$
40	$2.50e-002$	$5.526e-005$	2.0	$8.846e-002$	$5.526e-005$	2.0	$8.846e-002$
80	$1.25e-002$	$1.382e-005$	2.0	$8.843e-002$	$1.382e-005$	2.0	$8.843e-002$
160	$6.25e-003$	$3.454e-006$	2.0	$8.842e-002$	$3.454e-006$	2.0	$8.842e-002$
320	$3.13e-003$	$8.635e-007$	2.0	$8.842e-002$	$8.635e-007$	2.0	$8.842e-002$

Table 97: Numerical experiment `ewa141bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.734e-003$		$2.398e-001$	$2.734e-003$		$2.398e-001$
20	$5.00e-002$	$7.110e-004$	1.9	$2.398e-001$	$7.110e-004$	1.9	$2.398e-001$
40	$2.50e-002$	$1.814e-004$	2.0	$2.606e-001$	$1.814e-004$	2.0	$2.606e-001$
80	$1.25e-002$	$4.582e-005$	2.0	$2.748e-001$	$4.582e-005$	2.0	$2.748e-001$
160	$6.25e-003$	$1.172e-005$	2.0	$2.532e-001$	$1.172e-005$	2.0	$2.532e-001$
320	$3.13e-003$	$2.986e-006$	2.0	$2.622e-001$	$2.986e-006$	2.0	$2.622e-001$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.836e-005$		$6.153e-003$	$6.162e-005$		$7.037e-003$
20	$5.00e-002$	$1.436e-005$	2.0	$6.153e-003$	$1.480e-005$	2.1	$6.153e-003$
40	$2.50e-002$	$3.573e-006$	2.0	$5.862e-003$	$3.633e-006$	2.0	$5.862e-003$
80	$1.25e-002$	$8.923e-007$	2.0	$5.750e-003$	$8.999e-007$	2.0	$5.750e-003$
160	$6.25e-003$	$2.230e-007$	2.0	$5.722e-003$	$2.240e-007$	2.0	$5.722e-003$
320	$3.13e-003$	$5.575e-008$	2.0	$5.712e-003$	$5.587e-008$	2.0	$5.712e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.051e-003$		$1.801e-001$	$2.051e-003$		$1.801e-001$
20	$5.00e-002$	$5.333e-004$	1.9	$1.801e-001$	$5.333e-004$	1.9	$1.801e-001$
40	$2.50e-002$	$1.390e-004$	1.9	$1.782e-001$	$1.390e-004$	1.9	$1.782e-001$
80	$1.25e-002$	$3.614e-005$	1.9	$1.806e-001$	$3.614e-005$	1.9	$1.806e-001$
160	$6.25e-003$	$9.225e-006$	2.0	$2.027e-001$	$9.225e-006$	2.0	$2.027e-001$
320	$3.13e-003$	$2.346e-006$	2.0	$2.083e-001$	$2.346e-006$	2.0	$2.083e-001$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$8.879e-007$		$8.275e-003$	$1.222e-005$		$1.154e-002$
20	$5.00e-002$	$5.669e-008$	4.0	$8.275e-003$	$1.555e-006$	3.0	$8.275e-003$
40	$2.50e-002$	$3.580e-009$	4.0	$8.671e-003$	$1.960e-007$	3.0	$8.671e-003$
80	$1.25e-002$	$2.249e-010$	4.0	$8.917e-003$	$2.460e-008$	3.0	$8.917e-003$
160	$6.25e-003$	$1.409e-011$	4.0	$9.064e-003$	$3.082e-009$	3.0	$9.064e-003$
320	$3.13e-003$	$8.818e-013$	4.0	$9.153e-003$	$3.856e-010$	3.0	$9.153e-003$

Table 98: Numerical experiment `ewa141bvpsuite` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.101e-004$		$8.956e-002$	$1.101e-004$		$8.956e-002$
20	$5.00e-002$	$1.465e-005$	2.9	$8.956e-002$	$1.465e-005$	2.9	$8.956e-002$
40	$2.50e-002$	$1.891e-006$	3.0	$1.021e-001$	$1.891e-006$	3.0	$1.021e-001$
80	$1.25e-002$	$2.402e-007$	3.0	$1.110e-001$	$2.402e-007$	3.0	$1.110e-001$
160	$6.25e-003$	$3.027e-008$	3.0	$1.168e-001$	$3.027e-008$	3.0	$1.168e-001$
320	$3.13e-003$	$3.799e-009$	3.0	$1.203e-001$	$3.799e-009$	3.0	$1.203e-001$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.033e-007$		$1.031e-003$	$1.033e-007$		$1.031e-003$
20	$5.00e-002$	$6.460e-009$	4.0	$1.031e-003$	$6.460e-009$	4.0	$1.031e-003$
40	$2.50e-002$	$4.038e-010$	4.0	$1.033e-003$	$4.038e-010$	4.0	$1.033e-003$
80	$1.25e-002$	$2.524e-011$	4.0	$1.034e-003$	$2.524e-011$	4.0	$1.034e-003$
160	$6.25e-003$	$1.578e-012$	4.0	$1.033e-003$	$1.578e-012$	4.0	$1.033e-003$
320	$3.13e-003$	$9.859e-014$	4.0	$1.034e-003$	$9.859e-014$	4.0	$1.034e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.877e-005$		$4.788e-002$	$5.877e-005$		$4.788e-002$
20	$5.00e-002$	$7.815e-006$	2.9	$4.788e-002$	$7.815e-006$	2.9	$4.788e-002$
40	$2.50e-002$	$1.008e-006$	3.0	$5.449e-002$	$1.008e-006$	3.0	$5.449e-002$
80	$1.25e-002$	$1.281e-007$	3.0	$5.922e-002$	$1.281e-007$	3.0	$5.922e-002$
160	$6.25e-003$	$1.614e-008$	3.0	$6.230e-002$	$1.614e-008$	3.0	$6.230e-002$
320	$3.13e-003$	$2.026e-009$	3.0	$6.417e-002$	$2.026e-009$	3.0	$6.417e-002$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$9.959e-011$		$9.914e-005$	$4.228e-008$		$3.972e-004$
20	$5.00e-002$	$1.558e-012$	6.0	$9.914e-005$	$2.693e-009$	4.0	$9.914e-005$
40	$2.50e-002$	$2.454e-014$	6.0	$9.645e-005$	$1.698e-010$	4.0	$9.645e-005$
80	$1.25e-002$	$7.772e-016$	5.0	$2.339e-006$	$1.066e-011$	4.0	$2.339e-006$
160	$6.25e-003$	$4.441e-016$	0.8	$2.673e-014$	$6.678e-013$	4.0	$2.673e-014$
320	$3.13e-003$	$4.441e-016$	0.0	$4.441e-016$	$4.163e-014$	4.0	$4.441e-016$

Table 99: Numerical experiment `ewa141bvpsuite` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.710e-006$		$2.726e-002$	$3.710e-006$		$2.726e-002$
20	$5.00e-002$	$2.544e-007$	3.9	$2.726e-002$	$2.544e-007$	3.9	$2.726e-002$
40	$2.50e-002$	$1.667e-008$	3.9	$3.315e-002$	$1.667e-008$	3.9	$3.315e-002$
80	$1.25e-002$	$1.068e-009$	4.0	$3.756e-002$	$1.068e-009$	4.0	$3.756e-002$
160	$6.25e-003$	$6.753e-011$	4.0	$4.050e-002$	$6.753e-011$	4.0	$4.050e-002$
320	$3.13e-003$	$4.246e-012$	4.0	$4.235e-002$	$4.246e-012$	4.0	$4.235e-002$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.399e-009$		$4.548e-005$	$4.804e-009$		$5.689e-005$
20	$5.00e-002$	$2.722e-010$	4.0	$4.548e-005$	$2.853e-010$	4.1	$4.548e-005$
40	$2.50e-002$	$1.696e-011$	4.0	$4.409e-005$	$1.739e-011$	4.0	$4.409e-005$
80	$1.25e-002$	$1.060e-012$	4.0	$4.344e-005$	$1.074e-012$	4.0	$4.344e-005$
160	$6.25e-003$	$6.672e-014$	4.0	$4.151e-005$	$6.728e-014$	4.0	$4.151e-005$
320	$3.13e-003$	$5.107e-015$	3.7	$9.918e-006$	$5.329e-015$	3.7	$9.918e-006$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.382e-006$		$1.018e-002$	$1.382e-006$		$1.018e-002$
20	$5.00e-002$	$9.467e-008$	3.9	$1.018e-002$	$9.467e-008$	3.9	$1.018e-002$
40	$2.50e-002$	$6.204e-009$	3.9	$1.235e-002$	$6.204e-009$	3.9	$1.235e-002$
80	$1.25e-002$	$3.972e-010$	4.0	$1.398e-002$	$3.972e-010$	4.0	$1.398e-002$
160	$6.25e-003$	$2.512e-011$	4.0	$1.507e-002$	$2.512e-011$	4.0	$1.507e-002$
320	$3.13e-003$	$1.580e-012$	4.0	$1.575e-002$	$1.580e-012$	4.0	$1.575e-002$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.016e-014$		$6.448e-009$	$3.026e-010$		$3.023e-005$
20	$5.00e-002$	$4.441e-016$	5.5	$6.448e-009$	$9.459e-012$	5.0	$6.448e-009$
40	$2.50e-002$	$4.441e-016$	0.0	$4.441e-016$	$2.955e-013$	5.0	$4.441e-016$
80	$1.25e-002$	$4.441e-016$	0.0	$4.441e-016$	$9.352e-015$	5.0	$4.441e-016$
160	$6.25e-003$	$5.551e-016$	-0.3	$1.083e-016$	$7.216e-016$	3.7	$1.083e-016$
320	$3.13e-003$	$5.551e-016$	0.0	$5.551e-016$	$7.772e-016$	-0.1	$5.551e-016$

Table 100: Numerical experiment `ewa141bvpsuite` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.382e-007$		$9.287e-003$	$1.382e-007$		$9.287e-003$
20	$5.00e-002$	$4.867e-009$	4.8	$9.287e-003$	$4.867e-009$	4.8	$9.287e-003$
40	$2.50e-002$	$1.618e-010$	4.9	$1.194e-002$	$1.618e-010$	4.9	$1.194e-002$
80	$1.25e-002$	$5.174e-012$	5.0	$1.463e-002$	$5.174e-012$	5.0	$1.463e-002$
160	$6.25e-003$	$3.018e-013$	4.1	$3.284e-004$	$3.018e-013$	4.1	$3.284e-004$
320	$3.13e-003$	$2.380e-013$	0.3	$1.714e-012$	$2.380e-013$	0.3	$1.714e-012$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.893e-012$		$5.126e-006$	$4.893e-012$		$5.126e-006$
20	$5.00e-002$	$7.538e-014$	6.0	$5.126e-006$	$7.538e-014$	6.0	$5.126e-006$
40	$2.50e-002$	$6.661e-016$	6.8	$5.666e-005$	$1.443e-015$	5.7	$5.666e-005$
80	$1.25e-002$	$1.110e-015$	-0.7	$4.394e-017$	$1.221e-015$	0.2	$4.394e-017$
160	$6.25e-003$	$1.221e-015$	-0.1	$6.078e-016$	$1.332e-015$	-0.1	$6.078e-016$
320	$3.13e-003$	$9.992e-016$	0.3	$5.308e-015$	$1.110e-015$	0.3	$5.308e-015$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa141bvpsuite	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.558e-008$		$2.398e-003$	$3.558e-008$		$2.398e-003$
20	$5.00e-002$	$1.252e-009$	4.8	$2.398e-003$	$1.252e-009$	4.8	$2.398e-003$
40	$2.50e-002$	$4.155e-011$	4.9	$3.090e-003$	$4.155e-011$	4.9	$3.090e-003$
80	$1.25e-002$	$1.482e-012$	4.8	$2.102e-003$	$1.482e-012$	4.8	$2.102e-003$
160	$6.25e-003$	$1.663e-013$	3.2	$1.503e-006$	$1.663e-013$	3.2	$1.503e-006$
320	$3.13e-003$	$9.259e-014$	0.8	$1.211e-011$	$9.259e-014$	0.8	$1.211e-011$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.551e-016$		$5.551e-016$	$8.401e-013$		$6.801e-007$
20	$5.00e-002$	$5.551e-016$	0.0	$5.551e-016$	$1.399e-014$	5.9	$5.551e-016$
40	$2.50e-002$	$7.772e-016$	-0.5	$1.297e-016$	$8.882e-016$	4.0	$1.297e-016$
80	$1.25e-002$	$7.772e-016$	0.0	$7.772e-016$	$9.992e-016$	-0.2	$7.772e-016$
160	$6.25e-003$	$8.882e-016$	-0.2	$3.341e-016$	$8.882e-016$	0.2	$3.341e-016$
320	$3.13e-003$	$7.772e-016$	0.2	$2.361e-015$	$8.882e-016$	0.0	$2.361e-015$

Table 101: Numerical experiment `ewa141bvpsuite` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.236e-02$			$3.236e-02$		
20	$5.00e-02$	$1.746e-02$	0.9	$2.512e-01$	$1.746e-02$	0.9	$2.512e-01$
40	$2.50e-02$	$9.057e-03$	0.9	$2.980e-01$	$9.057e-03$	0.9	$2.980e-01$
80	$1.25e-02$	$4.610e-03$	1.0	$3.292e-01$	$4.610e-03$	1.0	$3.292e-01$
160	$6.25e-03$	$2.326e-03$	1.0	$3.487e-01$	$2.326e-03$	1.0	$3.487e-01$
320	$3.13e-03$	$1.168e-03$	1.0	$3.603e-01$	$1.168e-03$	1.0	$3.603e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.490e-03$			$5.490e-03$		
20	$5.00e-02$	$1.467e-03$	1.9	$4.400e-01$	$1.467e-03$	1.9	$4.400e-01$
40	$2.50e-02$	$3.788e-04$	2.0	$5.106e-01$	$3.788e-04$	2.0	$5.106e-01$
80	$1.25e-02$	$9.621e-05$	2.0	$5.570e-01$	$9.621e-05$	2.0	$5.570e-01$
160	$6.25e-03$	$2.424e-05$	2.0	$5.859e-01$	$2.424e-05$	2.0	$5.859e-01$
320	$3.13e-03$	$6.084e-06$	2.0	$6.031e-01$	$6.084e-06$	2.0	$6.031e-01$

Table 102: Numerical experiment `ewa142` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.508e-03$			$3.508e-03$		
20	$5.00e-02$	$2.304e-03$	0.6	$1.417e-02$	$2.304e-03$	0.6	$1.417e-02$
40	$2.50e-02$	$1.308e-03$	0.8	$2.665e-02$	$1.308e-03$	0.8	$2.665e-02$
80	$1.25e-02$	$6.969e-04$	0.9	$3.722e-02$	$6.969e-04$	0.9	$3.722e-02$
160	$6.25e-03$	$3.603e-04$	1.0	$4.515e-02$	$3.603e-04$	1.0	$4.515e-02$
320	$3.13e-03$	$1.834e-04$	1.0	$5.065e-02$	$1.834e-04$	1.0	$5.065e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.407e-04$			$2.407e-04$		
20	$5.00e-02$	$6.740e-05$	1.8	$1.651e-02$	$6.740e-05$	1.8	$1.651e-02$
40	$2.50e-02$	$1.832e-05$	1.9	$1.879e-02$	$1.832e-05$	1.9	$1.879e-02$
80	$1.25e-02$	$4.906e-06$	1.9	$2.032e-02$	$4.906e-06$	1.9	$2.032e-02$
160	$6.25e-03$	$1.283e-06$	1.9	$2.363e-02$	$1.283e-06$	1.9	$2.363e-02$
320	$3.13e-03$	$3.316e-07$	2.0	$2.572e-02$	$3.316e-07$	2.0	$2.572e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.703e-03$			$3.703e-03$		
20	$5.00e-02$	$2.268e-03$	0.7	$1.889e-02$	$2.268e-03$	0.7	$1.889e-02$
40	$2.50e-02$	$1.251e-03$	0.9	$2.962e-02$	$1.251e-03$	0.9	$2.962e-02$
80	$1.25e-02$	$6.582e-04$	0.9	$3.821e-02$	$6.582e-04$	0.9	$3.821e-02$
160	$6.25e-03$	$3.380e-04$	1.0	$4.447e-02$	$3.380e-04$	1.0	$4.447e-02$
320	$3.13e-03$	$1.714e-04$	1.0	$4.874e-02$	$1.714e-04$	1.0	$4.874e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.022e-04$			$2.022e-04$		
20	$5.00e-02$	$5.810e-05$	1.8	$1.273e-02$	$5.810e-05$	1.8	$1.273e-02$
40	$2.50e-02$	$1.570e-05$	1.9	$1.661e-02$	$1.570e-05$	1.9	$1.661e-02$
80	$1.25e-02$	$4.104e-06$	1.9	$1.980e-02$	$4.104e-06$	1.9	$1.980e-02$
160	$6.25e-03$	$1.053e-06$	2.0	$2.232e-02$	$1.053e-06$	2.0	$2.232e-02$
320	$3.13e-03$	$2.671e-07$	2.0	$2.419e-02$	$2.671e-07$	2.0	$2.419e-02$

Table 103: Numerical experiment `ewa142` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.059e-05$			$2.059e-05$		
20	$5.00e-02$	$2.468e-06$	3.1	$2.369e-02$	$2.468e-06$	3.1	$2.369e-02$
40	$2.50e-02$	$2.984e-07$	3.0	$2.281e-02$	$2.984e-07$	3.0	$2.281e-02$
80	$1.25e-02$	$3.658e-08$	3.0	$2.118e-02$	$3.658e-08$	3.0	$2.118e-02$
160	$6.25e-03$	$4.835e-09$	2.9	$1.315e-02$	$4.835e-09$	2.9	$1.315e-02$
320	$3.13e-03$	$8.310e-09$	-0.8	$9.168e-11$	$8.310e-09$	-0.8	$9.168e-11$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.040e-06$			$4.040e-06$		
20	$5.00e-02$	$2.859e-07$	3.8	$2.674e-02$	$2.859e-07$	3.8	$2.674e-02$
40	$2.50e-02$	$1.902e-08$	3.9	$3.495e-02$	$1.902e-08$	3.9	$3.495e-02$
80	$1.25e-02$	$1.226e-09$	4.0	$4.129e-02$	$1.226e-09$	4.0	$4.129e-02$
160	$6.25e-03$	$7.699e-11$	4.0	$4.869e-02$	$7.699e-11$	4.0	$4.869e-02$
320	$3.13e-03$	$1.099e-11$	2.8	$1.196e-04$	$1.099e-11$	2.8	$1.196e-04$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.761e-05$			$1.761e-05$		
20	$5.00e-02$	$2.170e-06$	3.0	$1.845e-02$	$2.170e-06$	3.0	$1.845e-02$
40	$2.50e-02$	$2.667e-07$	3.0	$1.868e-02$	$2.667e-07$	3.0	$1.868e-02$
80	$1.25e-02$	$3.277e-08$	3.0	$1.873e-02$	$3.277e-08$	3.0	$1.873e-02$
160	$6.25e-03$	$3.345e-09$	3.3	$6.035e-02$	$3.345e-09$	3.3	$6.035e-02$
320	$3.13e-03$	$5.458e-09$	-0.7	$9.277e-11$	$5.458e-09$	-0.7	$9.277e-11$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.247e-06$			$2.247e-06$		
20	$5.00e-02$	$1.581e-07$	3.8	$1.516e-02$	$1.581e-07$	3.8	$1.516e-02$
40	$2.50e-02$	$1.049e-08$	3.9	$1.954e-02$	$1.049e-08$	3.9	$1.954e-02$
80	$1.25e-02$	$6.762e-10$	4.0	$2.277e-02$	$6.762e-10$	4.0	$2.277e-02$
160	$6.25e-03$	$4.419e-11$	3.9	$2.089e-02$	$4.419e-11$	3.9	$2.089e-02$
320	$3.13e-03$	$4.764e-12$	3.2	$5.352e-04$	$4.764e-12$	3.2	$5.352e-04$

Table 104: Numerical experiment `ewa142` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.338e-06$			$6.338e-06$		
20	$5.00e-02$	$7.566e-07$	3.1	$7.383e-03$	$7.566e-07$	3.1	$7.383e-03$
40	$2.50e-02$	$9.208e-08$	3.0	$6.794e-03$	$9.208e-08$	3.0	$6.794e-03$
80	$1.25e-02$	$1.124e-08$	3.0	$6.692e-03$	$1.124e-08$	3.0	$6.692e-03$
160	$6.25e-03$	$5.384e-09$	1.1	$1.178e-06$	$5.384e-09$	1.1	$1.178e-06$
320	$3.13e-03$	$1.045e-09$	2.4	$8.815e-04$	$1.045e-09$	2.4	$8.815e-04$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.161e-07$			$1.161e-07$		
20	$5.00e-02$	$7.301e-09$	4.0	$1.137e-03$	$7.301e-09$	4.0	$1.137e-03$
40	$2.50e-02$	$5.213e-10$	3.8	$6.569e-04$	$5.213e-10$	3.8	$6.569e-04$
80	$1.25e-02$	$3.675e-11$	3.8	$7.032e-04$	$3.675e-11$	3.8	$7.032e-04$
160	$6.25e-03$	$1.105e-11$	1.7	$7.305e-08$	$1.105e-11$	1.7	$7.305e-08$
320	$3.13e-03$	$1.653e-11$	-0.6	$5.803e-13$	$1.653e-11$	-0.6	$5.803e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.980e-06$			$3.980e-06$		
20	$5.00e-02$	$4.858e-07$	3.0	$4.306e-03$	$4.858e-07$	3.0	$4.306e-03$
40	$2.50e-02$	$5.978e-08$	3.0	$4.160e-03$	$5.978e-08$	3.0	$4.160e-03$
80	$1.25e-02$	$7.404e-09$	3.0	$4.020e-03$	$7.404e-09$	3.0	$4.020e-03$
160	$6.25e-03$	$1.058e-11$	9.5	$7.180e+09$	$1.058e-11$	9.5	$7.180e+09$
320	$3.13e-03$	$5.277e-09$	-9.0	$1.861e-31$	$5.277e-09$	-9.0	$1.861e-31$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.995e-08$			$3.995e-08$		
20	$5.00e-02$	$2.594e-09$	3.9	$3.517e-04$	$2.594e-09$	3.9	$3.517e-04$
40	$2.50e-02$	$2.115e-10$	3.6	$1.316e-04$	$2.115e-10$	3.6	$1.316e-04$
80	$1.25e-02$	$1.490e-11$	3.8	$2.866e-04$	$1.490e-11$	3.8	$2.866e-04$
160	$6.25e-03$	$1.732e-13$	6.4	$2.533e+01$	$1.732e-13$	6.4	$2.533e+01$
320	$3.13e-03$	$3.079e-12$	-4.2	$1.222e-22$	$3.079e-12$	-4.2	$1.222e-22$

Table 105: Numerical experiment `ewa142` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.260e-08$			$9.260e-08$		
20	$5.00e-02$	$2.949e-09$	5.0	$8.696e-03$	$2.949e-09$	5.0	$8.696e-03$
40	$2.50e-02$	$7.917e-10$	1.9	$8.669e-07$	$7.917e-10$	1.9	$8.669e-07$
80	$1.25e-02$	$8.147e-10$	-0.0	$6.798e-10$	$8.147e-10$	-0.0	$6.798e-10$
160	$6.25e-03$	$9.346e-09$	-3.5	$1.630e-16$	$9.346e-09$	-3.5	$1.630e-16$
320	$3.13e-03$	$3.626e-08$	-2.0	$4.565e-13$	$3.626e-08$	-2.0	$4.565e-13$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.863e-09$			$4.863e-09$		
20	$5.00e-02$	$9.376e-11$	5.7	$2.418e-03$	$9.376e-11$	5.7	$2.418e-03$
40	$2.50e-02$	$4.240e-12$	4.5	$6.075e-05$	$4.240e-12$	4.5	$6.075e-05$
80	$1.25e-02$	$2.972e-12$	0.5	$2.811e-11$	$2.972e-12$	0.5	$2.811e-11$
160	$6.25e-03$	$1.465e-11$	-2.3	$1.239e-16$	$1.465e-11$	-2.3	$1.239e-16$
320	$3.13e-03$	$2.866e-11$	-1.0	$1.076e-13$	$2.866e-11$	-1.0	$1.076e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.750e-08$			$4.750e-08$		
20	$5.00e-02$	$1.542e-09$	4.9	$4.187e-03$	$1.542e-09$	4.9	$4.187e-03$
40	$2.50e-02$	$8.984e-11$	4.1	$3.339e-04$	$8.984e-11$	4.1	$3.339e-04$
80	$1.25e-02$	$4.346e-10$	-2.3	$2.041e-14$	$4.346e-10$	-2.3	$2.041e-14$
160	$6.25e-03$	$3.223e-10$	0.4	$2.878e-09$	$3.223e-10$	0.4	$2.878e-09$
320	$3.13e-03$	$1.724e-08$	-5.7	$7.153e-23$	$1.724e-08$	-5.7	$7.153e-23$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.251e-09$			$1.251e-09$		
20	$5.00e-02$	$2.405e-11$	5.7	$6.284e-04$	$2.405e-11$	5.7	$6.284e-04$
40	$2.50e-02$	$3.279e-13$	6.2	$2.773e-03$	$3.279e-13$	6.2	$2.773e-03$
80	$1.25e-02$	$6.716e-13$	-1.0	$7.221e-15$	$6.716e-13$	-1.0	$7.221e-15$
160	$6.25e-03$	$6.306e-13$	0.1	$1.000e-12$	$6.306e-13$	0.1	$1.000e-12$
320	$3.13e-03$	$6.690e-12$	-3.4	$1.949e-20$	$6.690e-12$	-3.4	$1.949e-20$

Table 106: Numerical experiment `ewa142` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.006e-002$		$5.021e-001$	$5.006e-002$		$5.021e-001$
20	$5.00e-002$	$2.501e-002$	1.0	$5.021e-001$	$2.501e-002$	1.0	$5.021e-001$
40	$2.50e-002$	$1.250e-002$	1.0	$5.007e-001$	$1.250e-002$	1.0	$5.007e-001$
80	$1.25e-002$	$6.250e-003$	1.0	$5.002e-001$	$6.250e-003$	1.0	$5.002e-001$
160	$6.25e-003$	$3.125e-003$	1.0	$5.001e-001$	$3.125e-003$	1.0	$5.001e-001$
320	$3.13e-003$	$1.563e-003$	1.0	$5.000e-001$	$1.563e-003$	1.0	$5.000e-001$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.880e-003$		$2.877e-001$	$2.880e-003$		$2.877e-001$
20	$5.00e-002$	$7.204e-004$	2.0	$2.877e-001$	$7.204e-004$	2.0	$2.877e-001$
40	$2.50e-002$	$1.801e-004$	2.0	$2.880e-001$	$1.801e-004$	2.0	$2.880e-001$
80	$1.25e-002$	$4.503e-005$	2.0	$2.881e-001$	$4.503e-005$	2.0	$2.881e-001$
160	$6.25e-003$	$1.126e-005$	2.0	$2.882e-001$	$1.126e-005$	2.0	$2.882e-001$
320	$3.13e-003$	$2.814e-006$	2.0	$2.882e-001$	$2.814e-006$	2.0	$2.882e-001$

Table 107: Numerical experiment `ewa142bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.345e-003$		$1.148e-001$	$1.345e-003$		$1.148e-001$
20	$5.00e-002$	$3.527e-004$	1.9	$1.148e-001$	$3.527e-004$	1.9	$1.148e-001$
40	$2.50e-002$	$9.034e-005$	2.0	$1.270e-001$	$9.034e-005$	2.0	$1.270e-001$
80	$1.25e-002$	$2.286e-005$	2.0	$1.354e-001$	$2.286e-005$	2.0	$1.354e-001$
160	$6.25e-003$	$5.751e-006$	2.0	$1.407e-001$	$5.751e-006$	2.0	$1.407e-001$
320	$3.13e-003$	$1.442e-006$	2.0	$1.439e-001$	$1.442e-006$	2.0	$1.439e-001$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.747e-004$		$1.816e-002$	$1.747e-004$		$1.816e-002$
20	$5.00e-002$	$4.316e-005$	2.0	$1.816e-002$	$4.316e-005$	2.0	$1.816e-002$
40	$2.50e-002$	$1.076e-005$	2.0	$1.749e-002$	$1.076e-005$	2.0	$1.749e-002$
80	$1.25e-002$	$2.688e-006$	2.0	$1.728e-002$	$2.689e-006$	2.0	$1.728e-002$
160	$6.25e-003$	$6.718e-007$	2.0	$1.722e-002$	$6.720e-007$	2.0	$1.722e-002$
320	$3.13e-003$	$1.679e-007$	2.0	$1.720e-002$	$1.680e-007$	2.0	$1.720e-002$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.009e-003$		$8.625e-002$	$1.009e-003$		$8.625e-002$
20	$5.00e-002$	$2.646e-004$	1.9	$8.625e-002$	$2.646e-004$	1.9	$8.625e-002$
40	$2.50e-002$	$6.776e-005$	2.0	$9.532e-002$	$6.776e-005$	2.0	$9.532e-002$
80	$1.25e-002$	$1.715e-005$	2.0	$1.016e-001$	$1.715e-005$	2.0	$1.016e-001$
160	$6.25e-003$	$4.314e-006$	2.0	$1.056e-001$	$4.314e-006$	2.0	$1.056e-001$
320	$3.13e-003$	$1.082e-006$	2.0	$1.080e-001$	$1.082e-006$	2.0	$1.080e-001$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.625e-006$		$1.618e-002$	$2.126e-005$		$2.037e-002$
20	$5.00e-002$	$1.017e-007$	4.0	$1.618e-002$	$2.692e-006$	3.0	$1.618e-002$
40	$2.50e-002$	$6.358e-009$	4.0	$1.625e-002$	$3.385e-007$	3.0	$1.625e-002$
80	$1.25e-002$	$3.974e-010$	4.0	$1.627e-002$	$4.245e-008$	3.0	$1.627e-002$
160	$6.25e-003$	$2.484e-011$	4.0	$1.627e-002$	$5.314e-009$	3.0	$1.627e-002$
320	$3.13e-003$	$1.553e-012$	4.0	$1.625e-002$	$6.647e-010$	3.0	$1.625e-002$

Table 108: Numerical experiment `ewa142bvpsuite` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.486e-005$		$4.439e-002$	$5.486e-005$		$4.439e-002$
20	$5.00e-002$	$7.309e-006$	2.9	$4.439e-002$	$7.309e-006$	2.9	$4.439e-002$
40	$2.50e-002$	$9.443e-007$	3.0	$5.072e-002$	$9.443e-007$	3.0	$5.072e-002$
80	$1.25e-002$	$1.200e-007$	3.0	$5.529e-002$	$1.200e-007$	3.0	$5.529e-002$
160	$6.25e-003$	$1.513e-008$	3.0	$5.826e-002$	$1.513e-008$	3.0	$5.826e-002$
320	$3.13e-003$	$1.899e-009$	3.0	$6.008e-002$	$1.899e-009$	3.0	$6.008e-002$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.373e-007$		$3.363e-003$	$3.373e-007$		$3.363e-003$
20	$5.00e-002$	$2.110e-008$	4.0	$3.363e-003$	$2.110e-008$	4.0	$3.363e-003$
40	$2.50e-002$	$1.319e-009$	4.0	$3.373e-003$	$1.319e-009$	4.0	$3.373e-003$
80	$1.25e-002$	$8.244e-011$	4.0	$3.376e-003$	$8.244e-011$	4.0	$3.376e-003$
160	$6.25e-003$	$5.153e-012$	4.0	$3.376e-003$	$5.153e-012$	4.0	$3.376e-003$
320	$3.13e-003$	$3.220e-013$	4.0	$3.385e-003$	$3.220e-013$	4.0	$3.385e-003$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.928e-005$		$2.373e-002$	$2.928e-005$		$2.373e-002$
20	$5.00e-002$	$3.899e-006$	2.9	$2.373e-002$	$3.899e-006$	2.9	$2.373e-002$
40	$2.50e-002$	$5.036e-007$	3.0	$2.707e-002$	$5.036e-007$	3.0	$2.707e-002$
80	$1.25e-002$	$6.401e-008$	3.0	$2.949e-002$	$6.401e-008$	3.0	$2.949e-002$
160	$6.25e-003$	$8.069e-009$	3.0	$3.108e-002$	$8.069e-009$	3.0	$3.108e-002$
320	$3.13e-003$	$1.013e-009$	3.0	$3.204e-002$	$1.013e-009$	3.0	$3.204e-002$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.336e-010$		$3.311e-004$	$1.344e-007$		$1.231e-003$
20	$5.00e-002$	$5.225e-012$	6.0	$3.311e-004$	$8.626e-009$	4.0	$3.311e-004$
40	$2.50e-002$	$8.149e-014$	6.0	$3.370e-004$	$5.461e-010$	4.0	$3.370e-004$
80	$1.25e-002$	$1.110e-015$	6.2	$6.922e-004$	$3.435e-011$	4.0	$6.922e-004$
160	$6.25e-003$	$6.661e-016$	0.7	$2.805e-014$	$2.154e-012$	4.0	$2.805e-014$
320	$3.13e-003$	$6.661e-016$	0.0	$6.661e-016$	$1.346e-013$	4.0	$6.661e-016$

Table 109: Numerical experiment `ewa142bvpsuite` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.036e-006$		$1.490e-002$	$2.036e-006$		$1.490e-002$
20	$5.00e-002$	$1.398e-007$	3.9	$1.490e-002$	$1.398e-007$	3.9	$1.490e-002$
40	$2.50e-002$	$9.166e-009$	3.9	$1.817e-002$	$9.166e-009$	3.9	$1.817e-002$
80	$1.25e-002$	$5.873e-010$	4.0	$2.057e-002$	$5.873e-010$	4.0	$2.057e-002$
160	$6.25e-003$	$3.701e-011$	4.0	$2.283e-002$	$3.701e-011$	4.0	$2.283e-002$
320	$3.13e-003$	$2.669e-012$	3.8	$8.505e-003$	$2.669e-012$	3.8	$8.505e-003$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.319e-008$		$1.350e-004$	$1.342e-008$		$1.394e-004$
20	$5.00e-002$	$8.188e-010$	4.0	$1.350e-004$	$8.290e-010$	4.0	$1.350e-004$
40	$2.50e-002$	$5.109e-011$	4.0	$1.320e-004$	$5.146e-011$	4.0	$1.320e-004$
80	$1.25e-002$	$3.193e-012$	4.0	$1.307e-004$	$3.206e-012$	4.0	$1.307e-004$
160	$6.25e-003$	$2.007e-013$	4.0	$1.261e-004$	$2.010e-013$	4.0	$1.261e-004$
320	$3.13e-003$	$1.377e-014$	3.9	$6.663e-005$	$1.377e-014$	3.9	$6.663e-005$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.582e-007$		$5.563e-003$	$7.582e-007$		$5.563e-003$
20	$5.00e-002$	$5.202e-008$	3.9	$5.563e-003$	$5.202e-008$	3.9	$5.563e-003$
40	$2.50e-002$	$3.410e-009$	3.9	$6.767e-003$	$3.410e-009$	3.9	$6.767e-003$
80	$1.25e-002$	$2.183e-010$	4.0	$7.685e-003$	$2.183e-010$	4.0	$7.685e-003$
160	$6.25e-003$	$1.407e-011$	4.0	$7.351e-003$	$1.407e-011$	4.0	$7.351e-003$
320	$3.13e-003$	$9.413e-013$	3.9	$5.618e-003$	$9.413e-013$	3.9	$5.618e-003$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.553e-014$		$1.939e-008$	$6.464e-010$		$6.143e-005$
20	$5.00e-002$	$6.661e-016$	5.7	$1.939e-008$	$2.051e-011$	5.0	$1.939e-008$
40	$2.50e-002$	$4.441e-016$	0.6	$3.843e-015$	$6.459e-013$	5.0	$3.843e-015$
80	$1.25e-002$	$6.661e-016$	-0.6	$5.132e-017$	$2.087e-014$	5.0	$5.132e-017$
160	$6.25e-003$	$4.441e-016$	0.6	$8.646e-015$	$1.110e-015$	4.2	$8.646e-015$
320	$3.13e-003$	$5.551e-016$	-0.3	$8.668e-017$	$6.661e-016$	0.7	$8.668e-017$

Table 110: Numerical experiment `ewa142bvpsuite` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.674e-008$		$5.167e-003$	$7.674e-008$		$5.167e-003$
20	$5.00e-002$	$2.701e-009$	4.8	$5.167e-003$	$2.701e-009$	4.8	$5.167e-003$
40	$2.50e-002$	$8.972e-011$	4.9	$6.644e-003$	$8.972e-011$	4.9	$6.644e-003$
80	$1.25e-002$	$2.995e-012$	4.9	$6.471e-003$	$2.995e-012$	4.9	$6.471e-003$
160	$6.25e-003$	$2.702e-013$	3.5	$1.205e-005$	$2.702e-013$	3.5	$1.205e-005$
320	$3.13e-003$	$9.271e-013$	-1.8	$3.243e-017$	$9.271e-013$	-1.8	$3.243e-017$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.600e-011$		$1.530e-005$	$1.600e-011$		$1.530e-005$
20	$5.00e-002$	$2.534e-013$	6.0	$1.530e-005$	$2.534e-013$	6.0	$1.530e-005$
40	$2.50e-002$	$6.883e-015$	5.2	$1.484e-006$	$6.883e-015$	5.2	$1.484e-006$
80	$1.25e-002$	$2.665e-015$	1.4	$1.075e-012$	$2.665e-015$	1.4	$1.075e-012$
160	$6.25e-003$	$2.887e-015$	-0.1	$1.606e-015$	$2.887e-015$	-0.1	$1.606e-015$
320	$3.13e-003$	$1.776e-015$	0.7	$1.010e-013$	$1.998e-015$	0.5	$1.010e-013$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa142bvpsuite	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.976e-008$		$1.334e-003$	$1.976e-008$		$1.334e-003$
20	$5.00e-002$	$6.949e-010$	4.8	$1.334e-003$	$6.949e-010$	4.8	$1.334e-003$
40	$2.50e-002$	$2.307e-011$	4.9	$1.711e-003$	$2.307e-011$	4.9	$1.711e-003$
80	$1.25e-002$	$7.436e-013$	5.0	$2.006e-003$	$7.436e-013$	5.0	$2.006e-003$
160	$6.25e-003$	$1.265e-013$	2.6	$5.430e-008$	$1.265e-013$	2.6	$5.430e-008$
320	$3.13e-003$	$5.609e-013$	-2.1	$2.321e-018$	$5.609e-013$	-2.1	$2.321e-018$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.776e-015$		$2.768e-015$	$2.669e-012$		$2.710e-006$
20	$5.00e-002$	$1.554e-015$	0.2	$2.768e-015$	$4.152e-014$	6.0	$2.768e-015$
40	$2.50e-002$	$1.554e-015$	0.0	$1.554e-015$	$2.220e-015$	4.2	$1.554e-015$
80	$1.25e-002$	$1.332e-015$	0.2	$3.530e-015$	$1.554e-015$	0.5	$3.530e-015$
160	$6.25e-003$	$2.220e-015$	-0.7	$5.273e-017$	$2.442e-015$	-0.7	$5.273e-017$
320	$3.13e-003$	$1.998e-015$	0.2	$4.803e-015$	$1.998e-015$	0.3	$4.803e-015$

Table 111: Numerical experiment `ewa142bvpsuite` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.475e-02$			$8.475e-02$		
20	$5.00e-02$	$5.421e-02$	0.6	$3.739e-01$	$5.421e-02$	0.6	$3.739e-01$
40	$2.50e-02$	$3.440e-02$	0.7	$3.872e-01$	$3.440e-02$	0.7	$3.872e-01$
80	$1.25e-02$	$2.175e-02$	0.7	$3.947e-01$	$2.175e-02$	0.7	$3.947e-01$
160	$6.25e-03$	$1.373e-02$	0.7	$3.989e-01$	$1.373e-02$	0.7	$3.989e-01$
320	$3.13e-03$	$8.657e-03$	0.7	$4.014e-01$	$8.657e-03$	0.7	$4.014e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.762e-03$			$4.762e-03$		
20	$5.00e-02$	$1.220e-03$	2.0	$4.396e-01$	$1.220e-03$	2.0	$4.396e-01$
40	$2.50e-02$	$3.086e-04$	2.0	$4.626e-01$	$3.086e-04$	2.0	$4.626e-01$
80	$1.25e-02$	$7.764e-05$	2.0	$4.778e-01$	$7.764e-05$	2.0	$4.778e-01$
160	$6.25e-03$	$1.947e-05$	2.0	$4.872e-01$	$1.947e-05$	2.0	$4.872e-01$
320	$3.13e-03$	$4.875e-06$	2.0	$4.928e-01$	$4.875e-06$	2.0	$4.928e-01$

Table 112: Numerical experiment `ewa3112` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.328e-15$			$6.328e-15$		
20	$5.00e-02$	$2.576e-14$	-2.0	$5.973e-17$	$2.576e-14$	-2.0	$5.973e-17$
40	$2.50e-02$	$1.674e-13$	-2.7	$7.899e-18$	$1.674e-13$	-2.7	$7.899e-18$
80	$1.25e-02$	$4.958e-13$	-1.6	$5.183e-16$	$4.958e-13$	-1.6	$5.183e-16$
160	$6.25e-03$	$5.278e-13$	-0.1	$3.339e-13$	$5.278e-13$	-0.1	$3.339e-13$
320	$3.13e-03$	$1.210e-11$	-4.5	$5.768e-23$	$1.210e-11$	-4.5	$5.768e-23$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.882e-16$			$8.882e-16$		
20	$5.00e-02$	$9.992e-16$	-0.2	$6.006e-16$	$9.992e-16$	-0.2	$6.006e-16$
40	$2.50e-02$	$1.998e-15$	-1.0	$4.996e-17$	$1.998e-15$	-1.0	$4.996e-17$
80	$1.25e-02$	$1.110e-15$	0.8	$4.563e-14$	$1.221e-15$	0.7	$2.747e-14$
160	$6.25e-03$	$4.885e-15$	-2.1	$9.496e-20$	$5.329e-15$	-2.1	$1.101e-19$
320	$3.13e-03$	$3.886e-15$	0.3	$2.609e-14$	$3.886e-15$	0.5	$5.383e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.299e-14$			$1.299e-14$		
20	$5.00e-02$	$1.038e-13$	-3.0	$1.305e-17$	$1.038e-13$	-3.0	$1.305e-17$
40	$2.50e-02$	$1.742e-13$	-0.7	$1.106e-14$	$1.742e-13$	-0.7	$1.106e-14$
80	$1.25e-02$	$6.239e-14$	1.5	$4.108e-11$	$6.239e-14$	1.5	$4.108e-11$
160	$6.25e-03$	$4.161e-13$	-2.7	$3.850e-19$	$4.161e-13$	-2.7	$3.850e-19$
320	$3.13e-03$	$6.958e-13$	-0.7	$9.650e-15$	$6.958e-13$	-0.7	$9.650e-15$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.551e-16$			$5.551e-16$		
20	$5.00e-02$	$4.441e-16$	0.3	$1.165e-15$	$7.772e-16$	-0.5	$1.815e-16$
40	$2.50e-02$	$3.442e-15$	-3.0	$6.368e-20$	$3.442e-15$	-2.1	$1.251e-18$
80	$1.25e-02$	$4.552e-15$	-0.4	$7.773e-16$	$4.663e-15$	-0.4	$6.837e-16$
160	$6.25e-03$	$1.643e-14$	-1.9	$1.361e-18$	$1.676e-14$	-1.8	$1.430e-18$
320	$3.13e-03$	$3.353e-14$	-1.0	$8.866e-17$	$3.364e-14$	-1.0	$1.023e-16$

Table 113: Numerical experiment `ewa3112` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.376e-14$			$1.376e-14$		
20	$5.00e-02$	$6.972e-14$	-2.3	$6.265e-17$	$6.972e-14$	-2.3	$6.265e-17$
40	$2.50e-02$	$2.548e-13$	-1.9	$2.576e-16$	$2.548e-13$	-1.9	$2.576e-16$
80	$1.25e-02$	$7.060e-13$	-1.5	$1.124e-15$	$7.060e-13$	-1.5	$1.124e-15$
160	$6.25e-03$	$1.256e-12$	-0.8	$1.853e-14$	$1.256e-12$	-0.8	$1.853e-14$
320	$3.13e-03$	$7.595e-12$	-2.6	$2.374e-18$	$7.595e-12$	-2.6	$2.374e-18$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.992e-16$			$9.992e-16$		
20	$5.00e-02$	$2.665e-15$	-1.4	$3.843e-17$	$2.887e-15$	-1.5	$2.945e-17$
40	$2.50e-02$	$6.217e-15$	-1.2	$6.843e-17$	$6.217e-15$	-1.1	$1.048e-16$
80	$1.25e-02$	$1.998e-15$	1.6	$2.611e-12$	$1.998e-15$	1.6	$2.611e-12$
160	$6.25e-03$	$3.775e-15$	-0.9	$3.585e-17$	$3.775e-15$	-0.9	$3.585e-17$
320	$3.13e-03$	$3.730e-14$	-3.3	$1.962e-22$	$3.741e-14$	-3.3	$1.919e-22$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.883e-15$			$6.883e-15$		
20	$5.00e-02$	$2.198e-14$	-1.7	$1.454e-16$	$2.198e-14$	-1.7	$1.454e-16$
40	$2.50e-02$	$1.345e-13$	-2.6	$8.761e-18$	$1.345e-13$	-2.6	$8.761e-18$
80	$1.25e-02$	$1.952e-13$	-0.5	$1.852e-14$	$1.952e-13$	-0.5	$1.852e-14$
160	$6.25e-03$	$3.466e-13$	-0.8	$5.170e-15$	$3.466e-13$	-0.8	$5.170e-15$
320	$3.13e-03$	$2.054e-12$	-2.6	$7.608e-19$	$2.054e-12$	-2.6	$7.608e-19$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.329e-15$			$5.329e-15$		
20	$5.00e-02$	$1.110e-14$	-1.1	$4.653e-16$	$1.110e-14$	-1.1	$4.653e-16$
40	$2.50e-02$	$2.265e-14$	-1.0	$5.096e-16$	$2.265e-14$	-1.0	$5.096e-16$
80	$1.25e-02$	$3.597e-14$	-0.7	$1.931e-15$	$3.597e-14$	-0.7	$1.931e-15$
160	$6.25e-03$	$7.505e-14$	-1.1	$3.441e-16$	$7.505e-14$	-1.1	$3.441e-16$
320	$3.13e-03$	$1.661e-13$	-1.1	$2.236e-16$	$1.661e-13$	-1.1	$2.236e-16$

Table 114: Numerical experiment `ewa3112` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.456e-13$			$2.456e-13$		
20	$5.00e-02$	$3.718e-13$	-0.6	$6.200e-14$	$3.718e-13$	-0.6	$6.200e-14$
40	$2.50e-02$	$3.942e-13$	-0.1	$2.885e-13$	$3.942e-13$	-0.1	$2.885e-13$
80	$1.25e-02$	$2.460e-12$	-2.6	$2.312e-17$	$2.460e-12$	-2.6	$2.312e-17$
160	$6.25e-03$	$6.419e-12$	-1.4	$5.720e-15$	$6.419e-12$	-1.4	$5.720e-15$
320	$3.13e-03$	$2.827e-11$	-2.1	$1.239e-16$	$2.827e-11$	-2.1	$1.239e-16$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.109e-15$			$3.331e-15$		
20	$5.00e-02$	$2.554e-15$	0.3	$5.975e-15$	$2.554e-15$	0.4	$8.051e-15$
40	$2.50e-02$	$5.329e-15$	-1.1	$1.062e-16$	$5.551e-15$	-1.1	$8.904e-17$
80	$1.25e-02$	$2.665e-14$	-2.3	$1.016e-18$	$2.687e-14$	-2.3	$1.258e-18$
160	$6.25e-03$	$4.619e-14$	-0.8	$8.230e-16$	$4.619e-14$	-0.8	$8.746e-16$
320	$3.13e-03$	$1.368e-13$	-1.6	$1.630e-17$	$1.368e-13$	-1.6	$1.630e-17$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.010e-14$			$1.010e-14$		
20	$5.00e-02$	$4.960e-14$	-2.3	$5.116e-17$	$4.960e-14$	-2.3	$5.116e-17$
40	$2.50e-02$	$5.562e-14$	-0.2	$3.022e-14$	$5.562e-14$	-0.2	$3.022e-14$
80	$1.25e-02$	$5.580e-13$	-3.3	$2.606e-19$	$5.580e-13$	-3.3	$2.606e-19$
160	$6.25e-03$	$9.304e-13$	-0.7	$2.203e-14$	$9.304e-13$	-0.7	$2.203e-14$
320	$3.13e-03$	$3.127e-12$	-1.7	$1.301e-16$	$3.127e-12$	-1.7	$1.301e-16$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.776e-16$			$4.441e-16$		
20	$5.00e-02$	$8.882e-16$	-1.7	$5.825e-18$	$1.554e-15$	-1.8	$6.920e-18$
40	$2.50e-02$	$1.998e-15$	-1.2	$2.669e-17$	$2.554e-15$	-0.7	$1.819e-16$
80	$1.25e-02$	$6.883e-15$	-1.8	$2.768e-18$	$6.994e-15$	-1.5	$1.197e-17$
160	$6.25e-03$	$6.217e-15$	0.1	$1.310e-14$	$6.217e-15$	0.2	$1.473e-14$
320	$3.13e-03$	$2.220e-15$	1.5	$1.169e-11$	$2.220e-15$	1.5	$1.169e-11$

Table 115: Numerical experiment `ewa3112` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.890e-13$			$1.890e-13$		
20	$5.00e-02$	$6.730e-13$	-1.8	$2.778e-15$	$6.730e-13$	-1.8	$2.778e-15$
40	$2.50e-02$	$2.836e-12$	-2.1	$1.344e-15$	$2.836e-12$	-2.1	$1.344e-15$
80	$1.25e-02$	$4.821e-12$	-0.8	$1.683e-13$	$4.821e-12$	-0.8	$1.683e-13$
160	$6.25e-03$	$1.670e-11$	-1.8	$1.870e-15$	$1.670e-11$	-1.8	$1.870e-15$
320	$3.13e-03$	$2.647e-11$	-0.7	$5.720e-13$	$2.647e-11$	-0.7	$5.720e-13$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.220e-15$			$3.220e-15$		
20	$5.00e-02$	$7.550e-15$	-1.2	$1.898e-16$	$7.550e-15$	-1.2	$1.898e-16$
40	$2.50e-02$	$1.210e-14$	-0.7	$9.824e-16$	$1.210e-14$	-0.7	$9.824e-16$
80	$1.25e-02$	$1.243e-14$	-0.0	$1.047e-14$	$1.243e-14$	-0.0	$1.047e-14$
160	$6.25e-03$	$1.044e-14$	0.3	$3.764e-14$	$1.044e-14$	0.3	$3.764e-14$
320	$3.13e-03$	$2.498e-14$	-1.3	$1.750e-17$	$2.498e-14$	-1.3	$1.750e-17$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3112	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.865e-14$			$1.865e-14$		
20	$5.00e-02$	$4.219e-14$	-1.2	$1.239e-15$	$4.219e-14$	-1.2	$1.239e-15$
40	$2.50e-02$	$1.861e-13$	-2.1	$6.917e-17$	$1.861e-13$	-2.1	$6.917e-17$
80	$1.25e-02$	$2.527e-13$	-0.4	$3.649e-14$	$2.527e-13$	-0.4	$3.649e-14$
160	$6.25e-03$	$1.324e-12$	-2.4	$7.149e-18$	$1.324e-12$	-2.4	$7.149e-18$
320	$3.13e-03$	$2.299e-12$	-0.8	$2.339e-14$	$2.299e-12$	-0.8	$2.339e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.665e-15$			$2.665e-15$		
20	$5.00e-02$	$4.441e-15$	-0.7	$4.883e-16$	$4.441e-15$	-0.7	$4.883e-16$
40	$2.50e-02$	$7.105e-15$	-0.7	$5.825e-16$	$7.105e-15$	-0.7	$5.825e-16$
80	$1.25e-02$	$2.287e-14$	-1.7	$1.412e-17$	$2.287e-14$	-1.7	$1.412e-17$
160	$6.25e-03$	$4.530e-14$	-1.0	$3.041e-16$	$4.530e-14$	-1.0	$3.041e-16$
320	$3.13e-03$	$9.948e-14$	-1.1	$1.427e-16$	$9.948e-14$	-1.1	$1.427e-16$

Table 116: Numerical experiment `ewa3112` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.648e-02$			$2.648e-02$		
20	$5.00e-02$	$1.205e-02$	1.1	$3.619e-01$	$1.205e-02$	1.1	$3.619e-01$
40	$2.50e-02$	$5.482e-03$	1.1	$3.631e-01$	$5.482e-03$	1.1	$3.631e-01$
80	$1.25e-02$	$2.503e-03$	1.1	$3.555e-01$	$2.503e-03$	1.1	$3.555e-01$
160	$6.25e-03$	$1.150e-03$	1.1	$3.425e-01$	$1.150e-03$	1.1	$3.425e-01$
320	$3.13e-03$	$5.314e-04$	1.1	$3.270e-01$	$5.314e-04$	1.1	$3.270e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.014e-03$			$4.014e-03$		
20	$5.00e-02$	$1.002e-03$	2.0	$4.028e-01$	$1.002e-03$	2.0	$4.028e-01$
40	$2.50e-02$	$2.506e-04$	2.0	$4.012e-01$	$2.506e-04$	2.0	$4.012e-01$
80	$1.25e-02$	$6.264e-05$	2.0	$4.010e-01$	$6.264e-05$	2.0	$4.010e-01$
160	$6.25e-03$	$1.566e-05$	2.0	$4.009e-01$	$1.566e-05$	2.0	$4.009e-01$
320	$3.13e-03$	$3.915e-06$	2.0	$4.009e-01$	$3.915e-06$	2.0	$4.009e-01$

Table 117: Numerical experiment `ewa31125` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.186e-02$			$2.186e-02$		
20	$5.00e-02$	$1.298e-02$	0.8	$1.234e-01$	$1.298e-02$	0.8	$1.234e-01$
40	$2.50e-02$	$7.571e-03$	0.8	$1.337e-01$	$7.571e-03$	0.8	$1.337e-01$
80	$1.25e-02$	$4.357e-03$	0.8	$1.432e-01$	$4.357e-03$	0.8	$1.432e-01$
160	$6.25e-03$	$2.485e-03$	0.8	$1.517e-01$	$2.485e-03$	0.8	$1.517e-01$
320	$3.13e-03$	$1.408e-03$	0.8	$1.594e-01$	$1.408e-03$	0.8	$1.594e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.154e-04$			$3.154e-04$		
20	$5.00e-02$	$7.105e-05$	2.2	$4.456e-02$	$7.105e-05$	2.2	$4.456e-02$
40	$2.50e-02$	$1.457e-05$	2.3	$6.685e-02$	$1.457e-05$	2.3	$6.685e-02$
80	$1.25e-02$	$3.535e-06$	2.0	$2.738e-02$	$3.535e-06$	2.0	$2.738e-02$
160	$6.25e-03$	$8.834e-07$	2.0	$2.266e-02$	$8.834e-07$	2.0	$2.266e-02$
320	$3.13e-03$	$2.208e-07$	2.0	$2.263e-02$	$2.208e-07$	2.0	$2.263e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.899e-02$			$1.899e-02$		
20	$5.00e-02$	$1.137e-02$	0.7	$1.044e-01$	$1.137e-02$	0.7	$1.044e-01$
40	$2.50e-02$	$6.657e-03$	0.8	$1.150e-01$	$6.657e-03$	0.8	$1.150e-01$
80	$1.25e-02$	$3.840e-03$	0.8	$1.245e-01$	$3.840e-03$	0.8	$1.245e-01$
160	$6.25e-03$	$2.193e-03$	0.8	$1.327e-01$	$2.193e-03$	0.8	$1.327e-01$
320	$3.13e-03$	$1.243e-03$	0.8	$1.399e-01$	$1.243e-03$	0.8	$1.399e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.283e-04$			$2.283e-04$		
20	$5.00e-02$	$4.739e-05$	2.3	$4.237e-02$	$4.739e-05$	2.3	$4.237e-02$
40	$2.50e-02$	$1.056e-05$	2.2	$3.113e-02$	$1.056e-05$	2.2	$3.113e-02$
80	$1.25e-02$	$2.234e-06$	2.2	$4.114e-02$	$2.234e-06$	2.2	$4.114e-02$
160	$6.25e-03$	$4.686e-07$	2.3	$4.340e-02$	$4.686e-07$	2.3	$4.340e-02$
320	$3.13e-03$	$9.795e-08$	2.3	$4.445e-02$	$9.795e-08$	2.3	$4.445e-02$

Table 118: Numerical experiment `ewa31125` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.246e-03$			$2.246e-03$		
20	$5.00e-02$	$1.205e-03$	0.9	$1.778e-02$	$1.205e-03$	0.9	$1.778e-02$
40	$2.50e-02$	$6.226e-04$	1.0	$2.087e-02$	$6.226e-04$	1.0	$2.087e-02$
80	$1.25e-02$	$3.141e-04$	1.0	$2.376e-02$	$3.141e-04$	1.0	$2.376e-02$
160	$6.25e-03$	$1.558e-04$	1.0	$2.637e-02$	$1.558e-04$	1.0	$2.637e-02$
320	$3.13e-03$	$7.644e-05$	1.0	$2.869e-02$	$7.644e-05$	1.0	$2.869e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.755e-05$			$3.755e-05$		
20	$5.00e-02$	$6.994e-06$	2.4	$9.985e-03$	$6.994e-06$	2.4	$9.985e-03$
40	$2.50e-02$	$1.261e-06$	2.5	$1.150e-02$	$1.261e-06$	2.5	$1.150e-02$
80	$1.25e-02$	$2.244e-07$	2.5	$1.229e-02$	$2.244e-07$	2.5	$1.229e-02$
160	$6.25e-03$	$3.977e-08$	2.5	$1.265e-02$	$3.977e-08$	2.5	$1.265e-02$
320	$3.13e-03$	$7.037e-09$	2.5	$1.280e-02$	$7.037e-09$	2.5	$1.280e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.711e-03$			$1.711e-03$		
20	$5.00e-02$	$9.525e-04$	0.8	$1.198e-02$	$9.525e-04$	0.8	$1.198e-02$
40	$2.50e-02$	$5.011e-04$	0.9	$1.530e-02$	$5.011e-04$	0.9	$1.530e-02$
80	$1.25e-02$	$2.551e-04$	1.0	$1.820e-02$	$2.551e-04$	1.0	$1.820e-02$
160	$6.25e-03$	$1.272e-04$	1.0	$2.072e-02$	$1.272e-04$	1.0	$2.072e-02$
320	$3.13e-03$	$6.261e-05$	1.0	$2.289e-02$	$6.261e-05$	1.0	$2.289e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.853e-05$			$1.853e-05$		
20	$5.00e-02$	$3.815e-06$	2.3	$3.536e-03$	$3.815e-06$	2.3	$3.536e-03$
40	$2.50e-02$	$7.117e-07$	2.4	$5.406e-03$	$7.117e-07$	2.4	$5.406e-03$
80	$1.25e-02$	$1.282e-07$	2.5	$6.506e-03$	$1.282e-07$	2.5	$6.506e-03$
160	$6.25e-03$	$2.282e-08$	2.5	$7.033e-03$	$2.282e-08$	2.5	$7.033e-03$
320	$3.13e-03$	$4.044e-09$	2.5	$7.262e-03$	$4.044e-09$	2.5	$7.262e-03$

Table 119: Numerical experiment `ewa31125` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.599e-04$			$8.599e-04$		
20	$5.00e-02$	$4.872e-04$	0.8	$5.677e-03$	$4.872e-04$	0.8	$5.677e-03$
40	$2.50e-02$	$2.614e-04$	0.9	$7.184e-03$	$2.614e-04$	0.9	$7.184e-03$
80	$1.25e-02$	$1.355e-04$	0.9	$8.644e-03$	$1.355e-04$	0.9	$8.644e-03$
160	$6.25e-03$	$6.856e-05$	1.0	$1.003e-02$	$6.856e-05$	1.0	$1.003e-02$
320	$3.13e-03$	$3.413e-05$	1.0	$1.132e-02$	$3.413e-05$	1.0	$1.132e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.081e-05$			$1.081e-05$		
20	$5.00e-02$	$2.073e-06$	2.4	$2.608e-03$	$2.073e-06$	2.4	$2.608e-03$
40	$2.50e-02$	$3.781e-07$	2.5	$3.238e-03$	$3.781e-07$	2.5	$3.238e-03$
80	$1.25e-02$	$6.761e-08$	2.5	$3.600e-03$	$6.761e-08$	2.5	$3.600e-03$
160	$6.25e-03$	$1.216e-08$	2.5	$3.465e-03$	$1.216e-08$	2.5	$3.465e-03$
320	$3.13e-03$	$2.194e-09$	2.5	$3.398e-03$	$2.194e-09$	2.5	$3.398e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.182e-04$			$5.182e-04$		
20	$5.00e-02$	$3.162e-04$	0.7	$2.672e-03$	$3.162e-04$	0.7	$2.672e-03$
40	$2.50e-02$	$1.756e-04$	0.8	$4.020e-03$	$1.756e-04$	0.8	$4.020e-03$
80	$1.25e-02$	$9.268e-05$	0.9	$5.270e-03$	$9.268e-05$	0.9	$5.270e-03$
160	$6.25e-03$	$4.740e-05$	1.0	$6.426e-03$	$4.740e-05$	1.0	$6.426e-03$
320	$3.13e-03$	$2.374e-05$	1.0	$7.477e-03$	$2.374e-05$	1.0	$7.477e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.507e-06$			$3.507e-06$		
20	$5.00e-02$	$8.300e-07$	2.1	$4.205e-04$	$8.300e-07$	2.1	$4.205e-04$
40	$2.50e-02$	$1.626e-07$	2.4	$9.526e-04$	$1.626e-07$	2.4	$9.526e-04$
80	$1.25e-02$	$2.981e-08$	2.4	$1.356e-03$	$2.981e-08$	2.4	$1.356e-03$
160	$6.25e-03$	$5.337e-09$	2.5	$1.573e-03$	$5.337e-09$	2.5	$1.573e-03$
320	$3.13e-03$	$9.616e-10$	2.5	$1.504e-03$	$9.616e-10$	2.5	$1.504e-03$

Table 120: Numerical experiment `ewa31125` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.952e-04$			$3.952e-04$		
20	$5.00e-02$	$2.295e-04$	0.8	$2.404e-03$	$2.295e-04$	0.8	$2.404e-03$
40	$2.50e-02$	$1.244e-04$	0.9	$3.243e-03$	$1.244e-04$	0.9	$3.243e-03$
80	$1.25e-02$	$6.469e-05$	0.9	$4.032e-03$	$6.469e-05$	0.9	$4.032e-03$
160	$6.25e-03$	$3.277e-05$	1.0	$4.762e-03$	$3.277e-05$	1.0	$4.762e-03$
320	$3.13e-03$	$1.631e-05$	1.0	$5.425e-03$	$1.631e-05$	1.0	$5.425e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.338e-06$			$4.338e-06$		
20	$5.00e-02$	$8.567e-07$	2.3	$9.491e-04$	$8.567e-07$	2.3	$9.491e-04$
40	$2.50e-02$	$1.583e-07$	2.4	$1.266e-03$	$1.583e-07$	2.4	$1.266e-03$
80	$1.25e-02$	$2.844e-08$	2.5	$1.468e-03$	$2.844e-08$	2.5	$1.468e-03$
160	$6.25e-03$	$5.058e-09$	2.5	$1.569e-03$	$5.058e-09$	2.5	$1.569e-03$
320	$3.13e-03$	$8.960e-10$	2.5	$1.613e-03$	$8.960e-10$	2.5	$1.613e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31125	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.897e-04$			$1.897e-04$		
20	$5.00e-02$	$1.264e-04$	0.6	$7.308e-04$	$1.264e-04$	0.6	$7.308e-04$
40	$2.50e-02$	$7.239e-05$	0.8	$1.405e-03$	$7.239e-05$	0.8	$1.405e-03$
80	$1.25e-02$	$3.875e-05$	0.9	$2.016e-03$	$3.875e-05$	0.9	$2.016e-03$
160	$6.25e-03$	$1.995e-05$	1.0	$2.579e-03$	$1.995e-05$	1.0	$2.579e-03$
320	$3.13e-03$	$1.002e-05$	1.0	$3.082e-03$	$1.002e-05$	1.0	$3.082e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.886e-07$			$8.886e-07$		
20	$5.00e-02$	$2.531e-07$	1.8	$5.761e-05$	$2.531e-07$	1.8	$5.761e-05$
40	$2.50e-02$	$5.284e-08$	2.3	$2.207e-04$	$5.284e-08$	2.3	$2.207e-04$
80	$1.25e-02$	$9.906e-09$	2.4	$3.912e-04$	$9.906e-09$	2.4	$3.912e-04$
160	$6.25e-03$	$1.788e-09$	2.5	$4.973e-04$	$1.788e-09$	2.5	$4.973e-04$
320	$3.13e-03$	$3.184e-10$	2.5	$5.486e-04$	$3.184e-10$	2.5	$5.486e-04$

Table 121: Numerical experiment `ewa31125` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **`tau`**			Error for $\boldsymbol{x}$ at Mesh **`tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.134e-03$			$9.134e-03$		
20	$5.00e-02$	$2.290e-03$	2.0	$9.049e-01$	$2.290e-03$	2.0	$9.049e-01$
40	$2.50e-02$	$5.728e-04$	2.0	$9.135e-01$	$5.728e-04$	2.0	$9.135e-01$
80	$1.25e-02$	$1.432e-04$	2.0	$9.157e-01$	$1.432e-04$	2.0	$9.157e-01$
160	$6.25e-03$	$3.581e-05$	2.0	$9.164e-01$	$3.581e-05$	2.0	$9.164e-01$
320	$3.13e-03$	$8.952e-06$	2.0	$9.166e-01$	$8.952e-06$	2.0	$9.166e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **`tau`**			Error for $\boldsymbol{u}$ at Mesh **`tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.782e-03$			$5.782e-03$		
20	$5.00e-02$	$1.445e-03$	2.0	$5.791e-01$	$1.445e-03$	2.0	$5.791e-01$
40	$2.50e-02$	$3.612e-04$	2.0	$5.782e-01$	$3.612e-04$	2.0	$5.782e-01$
80	$1.25e-02$	$9.029e-05$	2.0	$5.779e-01$	$9.029e-05$	2.0	$5.779e-01$
160	$6.25e-03$	$2.257e-05$	2.0	$5.779e-01$	$2.257e-05$	2.0	$5.779e-01$
320	$3.13e-03$	$5.643e-06$	2.0	$5.778e-01$	$5.643e-06$	2.0	$5.778e-01$

Table 122: Numerical experiment `ewa3113` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.578e-02$			$2.578e-02$		
20	$5.00e-02$	$1.290e-02$	1.0	$2.570e-01$	$1.290e-02$	1.0	$2.570e-01$
40	$2.50e-02$	$6.454e-03$	1.0	$2.577e-01$	$6.454e-03$	1.0	$2.577e-01$
80	$1.25e-02$	$3.227e-03$	1.0	$2.580e-01$	$3.227e-03$	1.0	$2.580e-01$
160	$6.25e-03$	$1.614e-03$	1.0	$2.581e-01$	$1.614e-03$	1.0	$2.581e-01$
320	$3.13e-03$	$8.068e-04$	1.0	$2.582e-01$	$8.068e-04$	1.0	$2.582e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.886e-04$			$5.886e-04$		
20	$5.00e-02$	$1.442e-04$	2.0	$6.291e-02$	$1.442e-04$	2.0	$6.291e-02$
40	$2.50e-02$	$3.591e-05$	2.0	$5.873e-02$	$3.591e-05$	2.0	$5.873e-02$
80	$1.25e-02$	$8.970e-06$	2.0	$5.776e-02$	$8.970e-06$	2.0	$5.776e-02$
160	$6.25e-03$	$2.242e-06$	2.0	$5.749e-02$	$2.242e-06$	2.0	$5.749e-02$
320	$3.13e-03$	$5.604e-07$	2.0	$5.742e-02$	$5.604e-07$	2.0	$5.742e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.208e-02$			$2.208e-02$		
20	$5.00e-02$	$1.111e-02$	1.0	$2.163e-01$	$1.111e-02$	1.0	$2.163e-01$
40	$2.50e-02$	$5.573e-03$	1.0	$2.192e-01$	$5.573e-03$	1.0	$2.192e-01$
80	$1.25e-02$	$2.791e-03$	1.0	$2.211e-01$	$2.791e-03$	1.0	$2.211e-01$
160	$6.25e-03$	$1.396e-03$	1.0	$2.222e-01$	$1.396e-03$	1.0	$2.222e-01$
320	$3.13e-03$	$6.985e-04$	1.0	$2.228e-01$	$6.985e-04$	1.0	$2.228e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.291e-04$			$2.291e-04$		
20	$5.00e-02$	$3.898e-05$	2.6	$8.229e-02$	$3.898e-05$	2.6	$8.229e-02$
40	$2.50e-02$	$7.157e-06$	2.4	$5.919e-02$	$7.157e-06$	2.4	$5.919e-02$
80	$1.25e-02$	$1.292e-06$	2.5	$6.487e-02$	$1.292e-06$	2.5	$6.487e-02$
160	$6.25e-03$	$2.281e-07$	2.5	$7.444e-02$	$2.281e-07$	2.5	$7.444e-02$
320	$3.13e-03$	$4.036e-08$	2.5	$7.328e-02$	$4.036e-08$	2.5	$7.328e-02$

Table 123: Numerical experiment `ewa3113` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.214e-14$			$2.214e-14$		
20	$5.00e-02$	$8.960e-14$	-2.0	$2.131e-16$	$8.960e-14$	-2.0	$2.131e-16$
40	$2.50e-02$	$1.025e-13$	-0.2	$5.016e-14$	$1.025e-13$	-0.2	$5.016e-14$
80	$1.25e-02$	$1.438e-13$	-0.5	$1.689e-14$	$1.438e-13$	-0.5	$1.689e-14$
160	$6.25e-03$	$2.551e-12$	-4.1	$1.828e-21$	$2.551e-12$	-4.1	$1.828e-21$
320	$3.13e-03$	$2.201e-12$	0.2	$7.497e-12$	$2.201e-12$	0.2	$7.497e-12$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.665e-16$			$3.331e-16$		
20	$5.00e-02$	$2.665e-15$	-4.0	$1.665e-20$	$2.665e-15$	-3.0	$3.331e-19$
40	$2.50e-02$	$2.665e-15$	0.0	$2.665e-15$	$2.887e-15$	-0.1	$1.885e-15$
80	$1.25e-02$	$2.665e-15$	0.0	$2.665e-15$	$2.887e-15$	0.0	$2.887e-15$
160	$6.25e-03$	$2.665e-15$	0.0	$2.665e-15$	$2.665e-15$	0.1	$4.788e-15$
320	$3.13e-03$	$2.842e-14$	-3.4	$7.915e-23$	$2.842e-14$	-3.4	$7.915e-23$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.488e-14$			$1.488e-14$		
20	$5.00e-02$	$1.574e-14$	-0.1	$1.235e-14$	$1.574e-14$	-0.1	$1.235e-14$
40	$2.50e-02$	$5.218e-14$	-1.7	$8.852e-17$	$5.218e-14$	-1.7	$8.852e-17$
80	$1.25e-02$	$7.638e-14$	-0.5	$6.867e-15$	$7.638e-14$	-0.5	$6.867e-15$
160	$6.25e-03$	$8.218e-13$	-3.4	$2.292e-20$	$8.218e-13$	-3.4	$2.292e-20$
320	$3.13e-03$	$8.712e-13$	-0.1	$5.360e-13$	$8.712e-13$	-0.1	$5.360e-13$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.441e-15$			$4.441e-15$		
20	$5.00e-02$	$8.438e-15$	-0.9	$5.266e-16$	$8.438e-15$	-0.9	$5.266e-16$
40	$2.50e-02$	$1.821e-14$	-1.1	$3.038e-16$	$1.821e-14$	-1.1	$3.038e-16$
80	$1.25e-02$	$2.665e-14$	-0.5	$2.400e-15$	$2.665e-14$	-0.5	$2.400e-15$
160	$6.25e-03$	$5.507e-14$	-1.0	$2.707e-16$	$5.507e-14$	-1.0	$2.707e-16$
320	$3.13e-03$	$1.301e-13$	-1.2	$1.015e-16$	$1.301e-13$	-1.2	$1.015e-16$

Table 124: Numerical experiment `ewa3113` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.205e-14$			$7.205e-14$		
20	$5.00e-02$	$8.449e-14$	-0.2	$4.246e-14$	$8.449e-14$	-0.2	$4.246e-14$
40	$2.50e-02$	$5.023e-13$	-2.6	$3.811e-17$	$5.023e-13$	-2.6	$3.811e-17$
80	$1.25e-02$	$1.815e-12$	-1.9	$5.397e-16$	$1.815e-12$	-1.9	$5.397e-16$
160	$6.25e-03$	$2.330e-12$	-0.4	$3.737e-13$	$2.330e-12$	-0.4	$3.737e-13$
320	$3.13e-03$	$2.246e-11$	-3.3	$1.452e-19$	$2.246e-11$	-3.3	$1.452e-19$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.992e-16$			$1.110e-15$		
20	$5.00e-02$	$3.553e-15$	-1.8	$1.478e-17$	$3.553e-15$	-1.7	$2.330e-17$
40	$2.50e-02$	$2.998e-15$	0.2	$7.404e-15$	$3.331e-15$	0.1	$4.696e-15$
80	$1.25e-02$	$9.659e-15$	-1.7	$5.921e-18$	$1.010e-14$	-1.6	$9.074e-18$
160	$6.25e-03$	$3.286e-14$	-1.8	$4.199e-18$	$3.308e-14$	-1.7	$5.592e-18$
320	$3.13e-03$	$1.119e-13$	-1.8	$4.171e-18$	$1.126e-13$	-1.8	$4.223e-18$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.132e-15$			$9.132e-15$		
20	$5.00e-02$	$2.837e-14$	-1.6	$2.115e-16$	$2.837e-14$	-1.6	$2.115e-16$
40	$2.50e-02$	$9.291e-14$	-1.7	$1.682e-16$	$9.291e-14$	-1.7	$1.682e-16$
80	$1.25e-02$	$7.538e-14$	0.3	$2.827e-13$	$7.538e-14$	0.3	$2.827e-13$
160	$6.25e-03$	$6.353e-13$	-3.1	$1.060e-19$	$6.353e-13$	-3.1	$1.060e-19$
320	$3.13e-03$	$7.916e-13$	-0.3	$1.269e-13$	$7.916e-13$	-0.3	$1.269e-13$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.220e-16$			$4.441e-16$		
20	$5.00e-02$	$1.110e-15$	-2.3	$1.058e-18$	$1.443e-15$	-1.7	$8.852e-18$
40	$2.50e-02$	$3.886e-16$	1.5	$1.037e-13$	$9.992e-16$	0.5	$7.072e-15$
80	$1.25e-02$	$6.883e-15$	-4.1	$8.831e-23$	$7.105e-15$	-2.8	$2.922e-20$
160	$6.25e-03$	$3.331e-15$	1.0	$6.775e-13$	$3.553e-15$	1.0	$5.684e-13$
320	$3.13e-03$	$2.998e-15$	0.2	$7.204e-15$	$3.220e-15$	0.1	$7.304e-15$

Table 125: Numerical experiment `ewa3113` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.447e-13$			$1.447e-13$		
20	$5.00e-02$	$1.322e-13$	0.1	$1.950e-13$	$1.322e-13$	0.1	$1.950e-13$
40	$2.50e-02$	$5.750e-13$	-2.1	$2.304e-16$	$5.750e-13$	-2.1	$2.304e-16$
80	$1.25e-02$	$2.961e-12$	-2.4	$9.373e-17$	$2.961e-12$	-2.4	$9.373e-17$
160	$6.25e-03$	$3.231e-11$	-3.4	$8.119e-19$	$3.231e-11$	-3.4	$8.119e-19$
320	$3.13e-03$	$8.211e-11$	-1.3	$3.495e-14$	$8.211e-11$	-1.3	$3.495e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.159e-16$			$9.992e-16$		
20	$5.00e-02$	$3.553e-15$	-2.0	$1.015e-17$	$3.553e-15$	-1.8	$1.478e-17$
40	$2.50e-02$	$1.243e-14$	-1.8	$1.582e-17$	$1.243e-14$	-1.8	$1.582e-17$
80	$1.25e-02$	$1.021e-14$	0.3	$3.542e-14$	$1.021e-14$	0.3	$3.542e-14$
160	$6.25e-03$	$7.272e-15$	0.5	$8.749e-14$	$7.272e-15$	0.5	$8.749e-14$
320	$3.13e-03$	$3.875e-14$	-2.4	$3.481e-20$	$3.875e-14$	-2.4	$3.481e-20$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3113	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.412e-14$			$3.412e-14$		
20	$5.00e-02$	$1.006e-13$	-1.6	$9.418e-16$	$1.006e-13$	-1.6	$9.418e-16$
40	$2.50e-02$	$2.118e-13$	-1.1	$4.017e-15$	$2.118e-13$	-1.1	$4.017e-15$
80	$1.25e-02$	$3.504e-13$	-0.7	$1.455e-14$	$3.504e-13$	-0.7	$1.455e-14$
160	$6.25e-03$	$1.128e-12$	-1.7	$2.164e-16$	$1.128e-12$	-1.7	$2.164e-16$
320	$3.13e-03$	$1.664e-12$	-0.6	$6.519e-14$	$1.664e-12$	-0.6	$6.519e-14$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.331e-15$			$3.331e-15$		
20	$5.00e-02$	$2.665e-15$	0.3	$6.990e-15$	$2.665e-15$	0.3	$6.990e-15$
40	$2.50e-02$	$5.773e-15$	-1.1	$9.427e-17$	$5.773e-15$	-1.1	$9.427e-17$
80	$1.25e-02$	$1.577e-14$	-1.4	$2.751e-17$	$1.577e-14$	-1.4	$2.751e-17$
160	$6.25e-03$	$3.686e-14$	-1.2	$7.343e-17$	$3.686e-14$	-1.2	$7.343e-17$
320	$3.13e-03$	$7.461e-14$	-1.0	$2.110e-16$	$7.461e-14$	-1.0	$2.110e-16$

Table 126: Numerical experiment `ewa3113` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	**odeType**	**dim**	**AbsTol**	**degree**	**colpts**	**vec**
ewa31135	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.325e-02$			$1.325e-02$		
20	$5.00e-02$	$3.331e-03$	2.0	$1.301e+00$	$3.331e-03$	2.0	$1.301e+00$
40	$2.50e-02$	$8.350e-04$	2.0	$1.317e+00$	$8.350e-04$	2.0	$1.317e+00$
80	$1.25e-02$	$2.090e-04$	2.0	$1.326e+00$	$2.090e-04$	2.0	$1.326e+00$
160	$6.25e-03$	$5.229e-05$	2.0	$1.332e+00$	$5.229e-05$	2.0	$1.332e+00$
320	$3.13e-03$	$1.308e-05$	2.0	$1.335e+00$	$1.308e-05$	2.0	$1.335e+00$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.805e-03$			$7.805e-03$		
20	$5.00e-02$	$1.951e-03$	2.0	$7.812e-01$	$1.951e-03$	2.0	$7.812e-01$
40	$2.50e-02$	$4.877e-04$	2.0	$7.805e-01$	$4.877e-04$	2.0	$7.805e-01$
80	$1.25e-02$	$1.219e-04$	2.0	$7.804e-01$	$1.219e-04$	2.0	$7.804e-01$
160	$6.25e-03$	$3.048e-05$	2.0	$7.803e-01$	$3.048e-05$	2.0	$7.803e-01$
320	$3.13e-03$	$7.620e-06$	2.0	$7.803e-01$	$7.620e-06$	2.0	$7.803e-01$

Table 127: Numerical experiment `ewa31135` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.471e-02$			$2.471e-02$		
20	$5.00e-02$	$1.115e-02$	1.1	$3.468e-01$	$1.115e-02$	1.1	$3.468e-01$
40	$2.50e-02$	$5.091e-03$	1.1	$3.309e-01$	$5.091e-03$	1.1	$3.309e-01$
80	$1.25e-02$	$2.339e-03$	1.1	$3.199e-01$	$2.339e-03$	1.1	$3.199e-01$
160	$6.25e-03$	$1.078e-03$	1.1	$3.128e-01$	$1.078e-03$	1.1	$3.128e-01$
320	$3.13e-03$	$4.979e-04$	1.1	$3.084e-01$	$4.979e-04$	1.1	$3.084e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.067e-03$			$1.067e-03$		
20	$5.00e-02$	$2.624e-04$	2.0	$1.127e-01$	$2.624e-04$	2.0	$1.127e-01$
40	$2.50e-02$	$6.538e-05$	2.0	$1.066e-01$	$6.538e-05$	2.0	$1.066e-01$
80	$1.25e-02$	$1.633e-05$	2.0	$1.051e-01$	$1.633e-05$	2.0	$1.051e-01$
160	$6.25e-03$	$4.082e-06$	2.0	$1.047e-01$	$4.082e-06$	2.0	$1.047e-01$
320	$3.13e-03$	$1.020e-06$	2.0	$1.045e-01$	$1.020e-06$	2.0	$1.045e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.083e-02$			$2.083e-02$		
20	$5.00e-02$	$9.453e-03$	1.1	$2.873e-01$	$9.453e-03$	1.1	$2.873e-01$
40	$2.50e-02$	$4.327e-03$	1.1	$2.770e-01$	$4.327e-03$	1.1	$2.770e-01$
80	$1.25e-02$	$1.990e-03$	1.1	$2.698e-01$	$1.990e-03$	1.1	$2.698e-01$
160	$6.25e-03$	$9.181e-04$	1.1	$2.650e-01$	$9.181e-04$	1.1	$2.650e-01$
320	$3.13e-03$	$4.242e-04$	1.1	$2.619e-01$	$4.242e-04$	1.1	$2.619e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.915e-04$			$1.915e-04$		
20	$5.00e-02$	$3.154e-05$	2.6	$7.661e-02$	$3.154e-05$	2.6	$7.661e-02$
40	$2.50e-02$	$5.141e-06$	2.6	$8.008e-02$	$5.141e-06$	2.6	$8.008e-02$
80	$1.25e-02$	$8.125e-07$	2.7	$9.439e-02$	$8.125e-07$	2.7	$9.439e-02$
160	$6.25e-03$	$1.278e-07$	2.7	$9.729e-02$	$1.278e-07$	2.7	$9.729e-02$
320	$3.13e-03$	$2.018e-08$	2.7	$9.460e-02$	$2.018e-08$	2.7	$9.460e-02$

Table 128: Numerical experiment `ewa31135` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.723e-04$			$7.723e-04$		
20	$5.00e-02$	$2.071e-04$	1.9	$6.123e-02$	$2.071e-04$	1.9	$6.123e-02$
40	$2.50e-02$	$5.497e-05$	1.9	$6.385e-02$	$5.497e-05$	1.9	$6.385e-02$
80	$1.25e-02$	$1.450e-05$	1.9	$6.617e-02$	$1.450e-05$	1.9	$6.617e-02$
160	$6.25e-03$	$3.806e-06$	1.9	$6.815e-02$	$3.806e-06$	1.9	$6.815e-02$
320	$3.13e-03$	$9.960e-07$	1.9	$6.977e-02$	$9.960e-07$	1.9	$6.977e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.184e-05$			$1.184e-05$		
20	$5.00e-02$	$1.052e-06$	3.5	$3.690e-02$	$1.052e-06$	3.5	$3.690e-02$
40	$2.50e-02$	$9.303e-08$	3.5	$3.750e-02$	$9.303e-08$	3.5	$3.750e-02$
80	$1.25e-02$	$8.224e-09$	3.5	$3.763e-02$	$8.224e-09$	3.5	$3.763e-02$
160	$6.25e-03$	$7.269e-10$	3.5	$3.766e-02$	$7.269e-10$	3.5	$3.766e-02$
320	$3.13e-03$	$6.425e-11$	3.5	$3.766e-02$	$6.425e-11$	3.5	$3.766e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.048e-04$			$6.048e-04$		
20	$5.00e-02$	$1.632e-04$	1.9	$4.692e-02$	$1.632e-04$	1.9	$4.692e-02$
40	$2.50e-02$	$4.351e-05$	1.9	$4.940e-02$	$4.351e-05$	1.9	$4.940e-02$
80	$1.25e-02$	$1.150e-05$	1.9	$5.170e-02$	$1.150e-05$	1.9	$5.170e-02$
160	$6.25e-03$	$3.024e-06$	1.9	$5.360e-02$	$3.024e-06$	1.9	$5.360e-02$
320	$3.13e-03$	$7.919e-07$	1.9	$5.512e-02$	$7.919e-07$	1.9	$5.512e-02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.308e-06$			$6.308e-06$		
20	$5.00e-02$	$5.665e-07$	3.5	$1.891e-02$	$5.665e-07$	3.5	$1.891e-02$
40	$2.50e-02$	$5.022e-08$	3.5	$2.002e-02$	$5.022e-08$	3.5	$2.002e-02$
80	$1.25e-02$	$4.441e-09$	3.5	$2.027e-02$	$4.441e-09$	3.5	$2.027e-02$
160	$6.25e-03$	$3.925e-10$	3.5	$2.032e-02$	$3.925e-10$	3.5	$2.032e-02$
320	$3.13e-03$	$3.470e-11$	3.5	$2.034e-02$	$3.470e-11$	3.5	$2.034e-02$

Table 129: Numerical experiment `ewa31135` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.313e-04$			$1.313e-04$		
20	$5.00e-02$	$3.891e-05$	1.8	$7.456e-03$	$3.891e-05$	1.8	$7.456e-03$
40	$2.50e-02$	$1.117e-05$	1.8	$8.559e-03$	$1.117e-05$	1.8	$8.559e-03$
80	$1.25e-02$	$3.136e-06$	1.8	$9.660e-03$	$3.136e-06$	1.8	$9.660e-03$
160	$6.25e-03$	$8.653e-07$	1.9	$1.074e-02$	$8.653e-07$	1.9	$1.074e-02$
320	$3.13e-03$	$2.358e-07$	1.9	$1.177e-02$	$2.358e-07$	1.9	$1.177e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.092e-06$			$1.092e-06$		
20	$5.00e-02$	$1.080e-07$	3.3	$2.381e-03$	$1.080e-07$	3.3	$2.381e-03$
40	$2.50e-02$	$1.009e-08$	3.4	$3.041e-03$	$1.009e-08$	3.4	$3.041e-03$
80	$1.25e-02$	$9.436e-10$	3.4	$3.020e-03$	$9.436e-10$	3.4	$3.020e-03$
160	$6.25e-03$	$8.719e-11$	3.4	$3.263e-03$	$8.719e-11$	3.4	$3.263e-03$
320	$3.13e-03$	$7.978e-12$	3.5	$3.506e-03$	$7.978e-12$	3.5	$3.506e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.968e-05$			$7.968e-05$		
20	$5.00e-02$	$2.423e-05$	1.7	$4.159e-03$	$2.423e-05$	1.7	$4.159e-03$
40	$2.50e-02$	$7.048e-06$	1.8	$5.035e-03$	$7.048e-06$	1.8	$5.035e-03$
80	$1.25e-02$	$1.992e-06$	1.8	$5.865e-03$	$1.992e-06$	1.8	$5.865e-03$
160	$6.25e-03$	$5.521e-07$	1.9	$6.646e-03$	$5.521e-07$	1.9	$6.646e-03$
320	$3.13e-03$	$1.508e-07$	1.9	$7.376e-03$	$1.508e-07$	1.9	$7.376e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.212e-07$			$4.212e-07$		
20	$5.00e-02$	$3.963e-08$	3.4	$1.082e-03$	$3.963e-08$	3.4	$1.082e-03$
40	$2.50e-02$	$3.873e-09$	3.4	$9.178e-04$	$3.873e-09$	3.4	$9.178e-04$
80	$1.25e-02$	$3.634e-10$	3.4	$1.142e-03$	$3.634e-10$	3.4	$1.142e-03$
160	$6.25e-03$	$3.352e-11$	3.4	$1.270e-03$	$3.352e-11$	3.4	$1.270e-03$
320	$3.13e-03$	$3.079e-12$	3.4	$1.310e-03$	$3.079e-12$	3.4	$1.310e-03$

Table 130: Numerical experiment `ewa31135` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.287e-05$			$3.287e-05$		
20	$5.00e-02$	$9.361e-06$	1.8	$2.131e-03$	$9.361e-06$	1.8	$2.131e-03$
40	$2.50e-02$	$2.581e-06$	1.9	$2.451e-03$	$2.581e-06$	1.9	$2.451e-03$
80	$1.25e-02$	$6.976e-07$	1.9	$2.728e-03$	$6.976e-07$	1.9	$2.728e-03$
160	$6.25e-03$	$1.861e-07$	1.9	$2.961e-03$	$1.861e-07$	1.9	$2.961e-03$
320	$3.13e-03$	$4.921e-08$	1.9	$3.157e-03$	$4.921e-08$	1.9	$3.157e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.574e-07$			$2.574e-07$		
20	$5.00e-02$	$2.303e-08$	3.5	$7.820e-04$	$2.303e-08$	3.5	$7.820e-04$
40	$2.50e-02$	$2.040e-09$	3.5	$8.161e-04$	$2.040e-09$	3.5	$8.161e-04$
80	$1.25e-02$	$1.803e-10$	3.5	$8.239e-04$	$1.803e-10$	3.5	$8.239e-04$
160	$6.25e-03$	$1.594e-11$	3.5	$8.255e-04$	$1.594e-11$	3.5	$8.255e-04$
320	$3.13e-03$	$1.409e-12$	3.5	$8.258e-04$	$1.409e-12$	3.5	$8.258e-04$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31135	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.690e-05$			$1.690e-05$		
20	$5.00e-02$	$4.988e-06$	1.8	$9.723e-04$	$4.988e-06$	1.8	$9.723e-04$
40	$2.50e-02$	$1.399e-06$	1.8	$1.212e-03$	$1.399e-06$	1.8	$1.212e-03$
80	$1.25e-02$	$3.816e-07$	1.9	$1.409e-03$	$3.816e-07$	1.9	$1.409e-03$
160	$6.25e-03$	$1.023e-07$	1.9	$1.570e-03$	$1.023e-07$	1.9	$1.570e-03$
320	$3.13e-03$	$2.714e-08$	1.9	$1.697e-03$	$2.714e-08$	1.9	$1.697e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.327e-08$			$7.327e-08$		
20	$5.00e-02$	$6.836e-09$	3.4	$1.936e-04$	$6.836e-09$	3.4	$1.936e-04$
40	$2.50e-02$	$6.101e-10$	3.5	$2.347e-04$	$6.101e-10$	3.5	$2.347e-04$
80	$1.25e-02$	$5.401e-11$	3.5	$2.447e-04$	$5.401e-11$	3.5	$2.447e-04$
160	$6.25e-03$	$4.776e-12$	3.5	$2.469e-04$	$4.776e-12$	3.5	$2.469e-04$
320	$3.13e-03$	$4.221e-13$	3.5	$2.473e-04$	$4.221e-13$	3.5	$2.473e-04$

Table 131: Numerical experiment `ewa31135` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.935e-02$			$1.935e-02$		
20	$5.00e-02$	$4.916e-03$	2.0	$1.833e+00$	$4.916e-03$	2.0	$1.833e+00$
40	$2.50e-02$	$1.239e-03$	2.0	$1.899e+00$	$1.239e-03$	2.0	$1.899e+00$
80	$1.25e-02$	$3.110e-04$	2.0	$1.941e+00$	$3.110e-04$	2.0	$1.941e+00$
160	$6.25e-03$	$7.789e-05$	2.0	$1.965e+00$	$7.789e-05$	2.0	$1.965e+00$
320	$3.13e-03$	$1.949e-05$	2.0	$1.980e+00$	$1.949e-05$	2.0	$1.980e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.008e-02$			$1.008e-02$		
20	$5.00e-02$	$2.519e-03$	2.0	$1.007e+00$	$2.519e-03$	2.0	$1.007e+00$
40	$2.50e-02$	$6.299e-04$	2.0	$1.008e+00$	$6.299e-04$	2.0	$1.008e+00$
80	$1.25e-02$	$1.575e-04$	2.0	$1.008e+00$	$1.575e-04$	2.0	$1.008e+00$
160	$6.25e-03$	$3.937e-05$	2.0	$1.008e+00$	$3.937e-05$	2.0	$1.008e+00$
320	$3.13e-03$	$9.842e-06$	2.0	$1.008e+00$	$9.842e-06$	2.0	$1.008e+00$

Table 132: Numerical experiment `ewa3114` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.392e-02$			$2.392e-02$		
20	$5.00e-02$	$1.009e-02$	1.2	$4.207e-01$	$1.009e-02$	1.2	$4.207e-01$
40	$2.50e-02$	$4.318e-03$	1.2	$3.956e-01$	$4.318e-03$	1.2	$3.956e-01$
80	$1.25e-02$	$1.862e-03$	1.2	$3.795e-01$	$1.862e-03$	1.2	$3.795e-01$
160	$6.25e-03$	$8.065e-04$	1.2	$3.695e-01$	$8.065e-04$	1.2	$3.695e-01$
320	$3.13e-03$	$3.501e-04$	1.2	$3.633e-01$	$3.501e-04$	1.2	$3.633e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.672e-03$			$1.672e-03$		
20	$5.00e-02$	$4.119e-04$	2.0	$1.754e-01$	$4.119e-04$	2.0	$1.754e-01$
40	$2.50e-02$	$1.026e-04$	2.0	$1.671e-01$	$1.026e-04$	2.0	$1.671e-01$
80	$1.25e-02$	$2.564e-05$	2.0	$1.649e-01$	$2.564e-05$	2.0	$1.649e-01$
160	$6.25e-03$	$6.409e-06$	2.0	$1.643e-01$	$6.409e-06$	2.0	$1.643e-01$
320	$3.13e-03$	$1.602e-06$	2.0	$1.641e-01$	$1.602e-06$	2.0	$1.641e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.988e-02$			$1.988e-02$		
20	$5.00e-02$	$8.434e-03$	1.2	$3.429e-01$	$8.434e-03$	1.2	$3.429e-01$
40	$2.50e-02$	$3.621e-03$	1.2	$3.261e-01$	$3.621e-03$	1.2	$3.261e-01$
80	$1.25e-02$	$1.564e-03$	1.2	$3.154e-01$	$1.564e-03$	1.2	$3.154e-01$
160	$6.25e-03$	$6.780e-04$	1.2	$3.086e-01$	$6.780e-04$	1.2	$3.086e-01$
320	$3.13e-03$	$2.944e-04$	1.2	$3.045e-01$	$2.944e-04$	1.2	$3.045e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.998e-04$			$1.998e-04$		
20	$5.00e-02$	$2.764e-05$	2.9	$1.427e-01$	$2.764e-05$	2.9	$1.427e-01$
40	$2.50e-02$	$4.135e-06$	2.7	$1.018e-01$	$4.135e-06$	2.7	$1.018e-01$
80	$1.25e-02$	$5.889e-07$	2.8	$1.323e-01$	$5.889e-07$	2.8	$1.323e-01$
160	$6.25e-03$	$8.536e-08$	2.8	$1.182e-01$	$8.536e-08$	2.8	$1.182e-01$
320	$3.13e-03$	$1.226e-08$	2.8	$1.268e-01$	$1.226e-08$	2.8	$1.268e-01$

Table 133: Numerical experiment `ewa3114` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.097e-04$			$5.097e-04$		
20	$5.00e-02$	$9.627e-05$	2.4	$1.293e-01$	$9.627e-05$	2.4	$1.293e-01$
40	$2.50e-02$	$1.821e-05$	2.4	$1.285e-01$	$1.821e-05$	2.4	$1.285e-01$
80	$1.25e-02$	$3.448e-06$	2.4	$1.280e-01$	$3.448e-06$	2.4	$1.280e-01$
160	$6.25e-03$	$6.530e-07$	2.4	$1.276e-01$	$6.530e-07$	2.4	$1.276e-01$
320	$3.13e-03$	$1.237e-07$	2.4	$1.276e-01$	$1.237e-07$	2.4	$1.276e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.362e-06$			$9.362e-06$		
20	$5.00e-02$	$5.858e-07$	4.0	$9.324e-02$	$5.858e-07$	4.0	$9.324e-02$
40	$2.50e-02$	$3.662e-08$	4.0	$9.367e-02$	$3.662e-08$	4.0	$9.367e-02$
80	$1.25e-02$	$2.289e-09$	4.0	$9.374e-02$	$2.289e-09$	4.0	$9.374e-02$
160	$6.25e-03$	$1.431e-10$	4.0	$9.375e-02$	$1.431e-10$	4.0	$9.375e-02$
320	$3.13e-03$	$8.941e-12$	4.0	$9.375e-02$	$8.941e-12$	4.0	$9.375e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.006e-04$			$4.006e-04$		
20	$5.00e-02$	$7.585e-05$	2.4	$1.008e-01$	$7.585e-05$	2.4	$1.008e-01$
40	$2.50e-02$	$1.438e-05$	2.4	$1.004e-01$	$1.438e-05$	2.4	$1.004e-01$
80	$1.25e-02$	$2.725e-06$	2.4	$1.005e-01$	$2.725e-06$	2.4	$1.005e-01$
160	$6.25e-03$	$5.162e-07$	2.4	$1.006e-01$	$5.162e-07$	2.4	$1.006e-01$
320	$3.13e-03$	$9.781e-08$	2.4	$1.006e-01$	$9.781e-08$	2.4	$1.006e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.972e-06$			$4.972e-06$		
20	$5.00e-02$	$3.123e-07$	4.0	$4.891e-02$	$3.123e-07$	4.0	$4.891e-02$
40	$2.50e-02$	$1.953e-08$	4.0	$4.983e-02$	$1.953e-08$	4.0	$4.983e-02$
80	$1.25e-02$	$1.221e-09$	4.0	$4.998e-02$	$1.221e-09$	4.0	$4.998e-02$
160	$6.25e-03$	$7.629e-11$	4.0	$5.000e-02$	$7.629e-11$	4.0	$5.000e-02$
320	$3.13e-03$	$4.768e-12$	4.0	$5.000e-02$	$4.768e-12$	4.0	$5.000e-02$

Table 134: Numerical experiment `ewa3114` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.944e-14$			$5.944e-14$		
20	$5.00e-02$	$2.104e-13$	-1.8	$8.930e-16$	$2.104e-13$	-1.8	$8.930e-16$
40	$2.50e-02$	$7.807e-13$	-1.9	$7.272e-16$	$7.807e-13$	-1.9	$7.272e-16$
80	$1.25e-02$	$3.570e-12$	-2.2	$2.393e-16$	$3.570e-12$	-2.2	$2.393e-16$
160	$6.25e-03$	$3.295e-11$	-3.2	$2.821e-18$	$3.295e-11$	-3.2	$2.821e-18$
320	$3.13e-03$	$5.972e-12$	2.5	$8.894e-06$	$5.972e-12$	2.5	$8.894e-06$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.882e-16$			$8.882e-16$		
20	$5.00e-02$	$6.217e-15$	-2.8	$1.384e-18$	$6.217e-15$	-2.8	$1.384e-18$
40	$2.50e-02$	$1.887e-15$	1.7	$1.075e-12$	$2.442e-15$	1.3	$3.526e-13$
80	$1.25e-02$	$1.332e-14$	-2.8	$5.741e-20$	$1.332e-14$	-2.4	$2.930e-19$
160	$6.25e-03$	$4.174e-14$	-1.6	$9.747e-18$	$4.174e-14$	-1.6	$9.747e-18$
320	$3.13e-03$	$9.948e-14$	-1.3	$7.234e-17$	$9.948e-14$	-1.3	$7.234e-17$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.989e-15$			$4.989e-15$		
20	$5.00e-02$	$2.248e-14$	-2.2	$3.356e-17$	$2.248e-14$	-2.2	$3.356e-17$
40	$2.50e-02$	$6.362e-14$	-1.5	$2.509e-16$	$6.362e-14$	-1.5	$2.509e-16$
80	$1.25e-02$	$6.244e-13$	-3.3	$3.347e-19$	$6.244e-13$	-3.3	$3.347e-19$
160	$6.25e-03$	$2.927e-13$	1.1	$7.516e-11$	$2.927e-13$	1.1	$7.516e-11$
320	$3.13e-03$	$4.467e-12$	-3.9	$6.313e-22$	$4.467e-12$	-3.9	$6.313e-22$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.110e-16$			$2.220e-16$		
20	$5.00e-02$	$6.661e-16$	-2.6	$2.887e-19$	$6.661e-16$	-1.6	$5.774e-18$
40	$2.50e-02$	$8.882e-16$	-0.4	$1.921e-16$	$1.776e-15$	-1.4	$9.606e-18$
80	$1.25e-02$	$5.329e-15$	-2.6	$6.416e-20$	$5.329e-15$	-1.6	$5.132e-18$
160	$6.25e-03$	$2.109e-15$	1.3	$1.867e-12$	$2.220e-15$	1.3	$1.350e-12$
320	$3.13e-03$	$3.442e-15$	-0.7	$5.854e-17$	$3.442e-15$	-0.6	$8.971e-17$

Table 135: Numerical experiment `ewa3114` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.290e-13$			$1.290e-13$		
20	$5.00e-02$	$3.188e-13$	-1.3	$6.383e-15$	$3.188e-13$	-1.3	$6.383e-15$
40	$2.50e-02$	$7.252e-13$	-1.2	$9.136e-15$	$7.252e-13$	-1.2	$9.136e-15$
80	$1.25e-02$	$6.109e-12$	-3.1	$8.609e-18$	$6.109e-12$	-3.1	$8.609e-18$
160	$6.25e-03$	$2.830e-11$	-2.2	$3.776e-16$	$2.830e-11$	-2.2	$3.776e-16$
320	$3.13e-03$	$1.135e-10$	-2.0	$1.087e-15$	$1.135e-10$	-2.0	$1.087e-15$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.109e-15$			$3.220e-15$		
20	$5.00e-02$	$6.106e-15$	-1.0	$3.300e-16$	$6.106e-15$	-0.9	$3.841e-16$
40	$2.50e-02$	$7.105e-15$	-0.2	$3.172e-15$	$7.105e-15$	-0.2	$3.172e-15$
80	$1.25e-02$	$7.105e-15$	0.0	$7.105e-15$	$7.105e-15$	0.0	$7.105e-15$
160	$6.25e-03$	$1.144e-14$	-0.7	$3.508e-16$	$1.144e-14$	-0.7	$3.508e-16$
320	$3.13e-03$	$7.494e-14$	-2.7	$1.203e-20$	$7.494e-14$	-2.7	$1.203e-20$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3114	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.002e-14$			$1.002e-14$		
20	$5.00e-02$	$3.491e-14$	-1.8	$1.585e-16$	$3.491e-14$	-1.8	$1.585e-16$
40	$2.50e-02$	$9.900e-14$	-1.5	$3.860e-16$	$9.900e-14$	-1.5	$3.860e-16$
80	$1.25e-02$	$4.742e-13$	-2.3	$2.371e-17$	$4.742e-13$	-2.3	$2.371e-17$
160	$6.25e-03$	$8.315e-13$	-0.8	$1.362e-14$	$8.315e-13$	-0.8	$1.362e-14$
320	$3.13e-03$	$8.148e-12$	-3.3	$4.599e-20$	$8.148e-12$	-3.3	$4.599e-20$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.665e-15$			$2.665e-15$		
20	$5.00e-02$	$2.887e-15$	-0.1	$2.042e-15$	$2.887e-15$	-0.1	$2.042e-15$
40	$2.50e-02$	$5.107e-15$	-0.8	$2.452e-16$	$5.107e-15$	-0.8	$2.452e-16$
80	$1.25e-02$	$1.155e-14$	-1.2	$6.649e-17$	$1.155e-14$	-1.2	$6.649e-17$
160	$6.25e-03$	$3.353e-14$	-1.5	$1.366e-17$	$3.353e-14$	-1.5	$1.366e-17$
320	$3.13e-03$	$6.639e-14$	-1.0	$2.254e-16$	$6.639e-14$	-1.0	$2.254e-16$

Table 136: Numerical experiment `ewa3114` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.634e-02$			$2.634e-02$		
20	$5.00e-02$	$6.770e-03$	2.0	$2.404e+00$	$6.770e-03$	2.0	$2.404e+00$
40	$2.50e-02$	$1.716e-03$	2.0	$2.553e+00$	$1.716e-03$	2.0	$2.553e+00$
80	$1.25e-02$	$4.318e-04$	2.0	$2.648e+00$	$4.318e-04$	2.0	$2.648e+00$
160	$6.25e-03$	$1.083e-04$	2.0	$2.705e+00$	$1.083e-04$	2.0	$2.705e+00$
320	$3.13e-03$	$2.713e-05$	2.0	$2.739e+00$	$2.713e-05$	2.0	$2.739e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.259e-02$			$1.259e-02$		
20	$5.00e-02$	$3.149e-03$	2.0	$1.256e+00$	$3.149e-03$	2.0	$1.256e+00$
40	$2.50e-02$	$7.875e-04$	2.0	$1.259e+00$	$7.875e-04$	2.0	$1.259e+00$
80	$1.25e-02$	$1.969e-04$	2.0	$1.260e+00$	$1.969e-04$	2.0	$1.260e+00$
160	$6.25e-03$	$4.922e-05$	2.0	$1.260e+00$	$4.922e-05$	2.0	$1.260e+00$
320	$3.13e-03$	$1.230e-05$	2.0	$1.260e+00$	$1.230e-05$	2.0	$1.260e+00$

Table 137: Numerical experiment `ewa31145` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.409e-02$			$2.409e-02$		
20	$5.00e-02$	$9.621e-03$	1.3	$5.083e-01$	$9.621e-03$	1.3	$5.083e-01$
40	$2.50e-02$	$3.900e-03$	1.3	$4.762e-01$	$3.900e-03$	1.3	$4.762e-01$
80	$1.25e-02$	$1.595e-03$	1.3	$4.548e-01$	$1.595e-03$	1.3	$4.548e-01$
160	$6.25e-03$	$6.556e-04$	1.3	$4.407e-01$	$6.556e-04$	1.3	$4.407e-01$
320	$3.13e-03$	$2.702e-04$	1.3	$4.315e-01$	$2.702e-04$	1.3	$4.315e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.403e-03$			$2.403e-03$		
20	$5.00e-02$	$5.929e-04$	2.0	$2.510e-01$	$5.929e-04$	2.0	$2.510e-01$
40	$2.50e-02$	$1.478e-04$	2.0	$2.402e-01$	$1.478e-04$	2.0	$2.402e-01$
80	$1.25e-02$	$3.692e-05$	2.0	$2.374e-01$	$3.692e-05$	2.0	$2.374e-01$
160	$6.25e-03$	$9.229e-06$	2.0	$2.366e-01$	$9.229e-06$	2.0	$2.366e-01$
320	$3.13e-03$	$2.307e-06$	2.0	$2.363e-01$	$2.307e-06$	2.0	$2.363e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.978e-02$			$1.978e-02$		
20	$5.00e-02$	$7.949e-03$	1.3	$4.084e-01$	$7.949e-03$	1.3	$4.084e-01$
40	$2.50e-02$	$3.234e-03$	1.3	$3.874e-01$	$3.234e-03$	1.3	$3.874e-01$
80	$1.25e-02$	$1.325e-03$	1.3	$3.732e-01$	$1.325e-03$	1.3	$3.732e-01$
160	$6.25e-03$	$5.452e-04$	1.3	$3.637e-01$	$5.452e-04$	1.3	$3.637e-01$
320	$3.13e-03$	$2.248e-04$	1.3	$3.574e-01$	$2.248e-04$	1.3	$3.574e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.803e-04$			$3.050e-04$		
20	$5.00e-02$	$2.565e-05$	2.8	$1.174e-01$	$3.879e-05$	3.0	$2.882e-01$
40	$2.50e-02$	$3.543e-06$	2.9	$1.333e-01$	$4.890e-06$	3.0	$2.989e-01$
80	$1.25e-02$	$4.776e-07$	2.9	$1.517e-01$	$6.139e-07$	3.0	$3.058e-01$
160	$6.25e-03$	$6.381e-08$	2.9	$1.606e-01$	$7.691e-08$	3.0	$3.100e-01$
320	$3.13e-03$	$8.503e-09$	2.9	$1.636e-01$	$9.625e-09$	3.0	$3.125e-01$

Table 138: Numerical experiment `ewa31145` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.743e-04$			$1.743e-04$		
20	$5.00e-02$	$2.280e-05$	2.9	$1.500e-01$	$2.280e-05$	2.9	$1.500e-01$
40	$2.50e-02$	$3.024e-06$	2.9	$1.412e-01$	$3.024e-06$	2.9	$1.412e-01$
80	$1.25e-02$	$4.055e-07$	2.9	$1.332e-01$	$4.055e-07$	2.9	$1.332e-01$
160	$6.25e-03$	$5.482e-08$	2.9	$1.265e-01$	$5.482e-08$	2.9	$1.265e-01$
320	$3.13e-03$	$7.463e-09$	2.9	$1.202e-01$	$7.463e-09$	2.9	$1.202e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.850e-06$			$7.850e-06$		
20	$5.00e-02$	$4.896e-07$	4.0	$7.908e-02$	$4.896e-07$	4.0	$7.908e-02$
40	$2.50e-02$	$3.058e-08$	4.0	$7.858e-02$	$3.058e-08$	4.0	$7.858e-02$
80	$1.25e-02$	$1.911e-09$	4.0	$7.836e-02$	$1.911e-09$	4.0	$7.836e-02$
160	$6.25e-03$	$1.194e-10$	4.0	$7.828e-02$	$1.194e-10$	4.0	$7.828e-02$
320	$3.13e-03$	$7.486e-12$	4.0	$7.646e-02$	$7.486e-12$	4.0	$7.646e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.387e-04$			$1.387e-04$		
20	$5.00e-02$	$1.812e-05$	2.9	$1.198e-01$	$1.812e-05$	2.9	$1.198e-01$
40	$2.50e-02$	$2.398e-06$	2.9	$1.134e-01$	$2.398e-06$	2.9	$1.134e-01$
80	$1.25e-02$	$3.210e-07$	2.9	$1.065e-01$	$3.210e-07$	2.9	$1.065e-01$
160	$6.25e-03$	$4.334e-08$	2.9	$1.010e-01$	$4.334e-08$	2.9	$1.010e-01$
320	$3.13e-03$	$5.886e-09$	2.9	$9.662e-02$	$5.886e-09$	2.9	$9.662e-02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.092e-06$			$3.092e-06$		
20	$5.00e-02$	$1.773e-07$	4.1	$4.119e-02$	$1.900e-07$	4.0	$3.274e-02$
40	$2.50e-02$	$1.048e-08$	4.1	$3.607e-02$	$1.194e-08$	4.0	$2.964e-02$
80	$1.25e-02$	$5.915e-10$	4.1	$4.617e-02$	$7.487e-10$	4.0	$3.009e-02$
160	$6.25e-03$	$3.391e-11$	4.1	$4.186e-02$	$4.682e-11$	4.0	$3.055e-02$
320	$3.13e-03$	$1.968e-12$	4.1	$3.823e-02$	$2.827e-12$	4.0	$3.953e-02$

Table 139: Numerical experiment `ewa31145` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.510e-05$			$8.510e-05$		
20	$5.00e-02$	$1.538e-05$	2.5	$2.499e-02$	$1.538e-05$	2.5	$2.499e-02$
40	$2.50e-02$	$2.747e-06$	2.5	$2.633e-02$	$2.747e-06$	2.5	$2.633e-02$
80	$1.25e-02$	$4.861e-07$	2.5	$2.765e-02$	$4.861e-07$	2.5	$2.765e-02$
160	$6.25e-03$	$8.539e-08$	2.5	$2.896e-02$	$8.539e-08$	2.5	$2.896e-02$
320	$3.13e-03$	$1.489e-08$	2.5	$3.052e-02$	$1.489e-08$	2.5	$3.052e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.513e-07$			$6.513e-07$		
20	$5.00e-02$	$3.780e-08$	4.1	$8.334e-03$	$3.780e-08$	4.1	$8.334e-03$
40	$2.50e-02$	$2.165e-09$	4.1	$8.821e-03$	$2.165e-09$	4.1	$8.821e-03$
80	$1.25e-02$	$1.231e-10$	4.1	$9.175e-03$	$1.231e-10$	4.1	$9.175e-03$
160	$6.25e-03$	$6.941e-12$	4.1	$9.649e-03$	$6.941e-12$	4.1	$9.649e-03$
320	$3.13e-03$	$3.886e-13$	4.2	$1.018e-02$	$3.886e-13$	4.2	$1.018e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.895e-05$			$4.895e-05$		
20	$5.00e-02$	$9.014e-06$	2.4	$1.352e-02$	$9.014e-06$	2.4	$1.352e-02$
40	$2.50e-02$	$1.624e-06$	2.5	$1.483e-02$	$1.624e-06$	2.5	$1.483e-02$
80	$1.25e-02$	$2.888e-07$	2.5	$1.596e-02$	$2.888e-07$	2.5	$1.596e-02$
160	$6.25e-03$	$5.086e-08$	2.5	$1.692e-02$	$5.086e-08$	2.5	$1.692e-02$
320	$3.13e-03$	$8.898e-09$	2.5	$1.777e-02$	$8.898e-09$	2.5	$1.777e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.270e-07$			$2.270e-07$		
20	$5.00e-02$	$1.319e-08$	4.1	$2.889e-03$	$1.319e-08$	4.1	$2.889e-03$
40	$2.50e-02$	$7.587e-10$	4.1	$3.026e-03$	$7.587e-10$	4.1	$3.026e-03$
80	$1.25e-02$	$4.288e-11$	4.1	$3.319e-03$	$4.288e-11$	4.1	$3.319e-03$
160	$6.25e-03$	$2.425e-12$	4.1	$3.302e-03$	$2.425e-12$	4.1	$3.302e-03$
320	$3.13e-03$	$1.360e-13$	4.2	$3.519e-03$	$1.360e-13$	4.2	$3.519e-03$

Table 140: Numerical experiment `ewa31145` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.428e-06$			$4.428e-06$		
20	$5.00e-02$	$6.415e-07$	2.8	$2.711e-03$	$6.415e-07$	2.8	$2.711e-03$
40	$2.50e-02$	$9.116e-08$	2.8	$2.948e-03$	$9.116e-08$	2.8	$2.948e-03$
80	$1.25e-02$	$1.280e-08$	2.8	$3.141e-03$	$1.280e-08$	2.8	$3.141e-03$
160	$6.25e-03$	$1.797e-09$	2.8	$3.148e-03$	$1.797e-09$	2.8	$3.148e-03$
320	$3.13e-03$	$1.971e-10$	3.2	$1.917e-02$	$1.971e-10$	3.2	$1.917e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.211e-08$			$3.211e-08$		
20	$5.00e-02$	$1.421e-09$	4.5	$1.012e-03$	$1.421e-09$	4.5	$1.012e-03$
40	$2.50e-02$	$6.279e-11$	4.5	$1.016e-03$	$6.279e-11$	4.5	$1.016e-03$
80	$1.25e-02$	$2.775e-12$	4.5	$1.017e-03$	$2.775e-12$	4.5	$1.017e-03$
160	$6.25e-03$	$1.226e-13$	4.5	$1.017e-03$	$1.226e-13$	4.5	$1.017e-03$
320	$3.13e-03$	$4.086e-14$	1.6	$3.835e-10$	$4.086e-14$	1.6	$3.835e-10$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa31145	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.212e-06$			$2.212e-06$		
20	$5.00e-02$	$3.268e-07$	2.8	$1.270e-03$	$3.268e-07$	2.8	$1.270e-03$
40	$2.50e-02$	$4.688e-08$	2.8	$1.441e-03$	$4.688e-08$	2.8	$1.441e-03$
80	$1.25e-02$	$6.616e-09$	2.8	$1.574e-03$	$6.616e-09$	2.8	$1.574e-03$
160	$6.25e-03$	$9.234e-10$	2.8	$1.687e-03$	$9.234e-10$	2.8	$1.687e-03$
320	$3.13e-03$	$1.304e-10$	2.8	$1.547e-03$	$1.304e-10$	2.8	$1.547e-03$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.689e-09$			$8.689e-09$		
20	$5.00e-02$	$3.861e-10$	4.5	$2.698e-04$	$3.861e-10$	4.5	$2.698e-04$
40	$2.50e-02$	$1.707e-11$	4.5	$2.757e-04$	$1.707e-11$	4.5	$2.757e-04$
80	$1.25e-02$	$7.546e-13$	4.5	$2.764e-04$	$7.546e-13$	4.5	$2.764e-04$
160	$6.25e-03$	$3.335e-14$	4.5	$2.764e-04$	$3.335e-14$	4.5	$2.764e-04$
320	$3.13e-03$	$5.906e-14$	-0.8	$5.073e-16$	$5.906e-14$	-0.8	$5.073e-16$

Table 141: Numerical experiment `ewa31145` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.706e-02$			$3.706e-02$		
20	$5.00e-02$	$8.808e-03$	2.1	$4.382e+00$	$8.808e-03$	2.1	$4.382e+00$
40	$2.50e-02$	$2.229e-03$	2.0	$3.342e+00$	$2.229e-03$	2.0	$3.342e+00$
80	$1.25e-02$	$5.577e-04$	2.0	$3.552e+00$	$5.577e-04$	2.0	$3.552e+00$
160	$6.25e-03$	$1.395e-04$	2.0	$3.564e+00$	$1.395e-04$	2.0	$3.564e+00$
320	$3.13e-03$	$3.487e-05$	2.0	$3.569e+00$	$3.487e-05$	2.0	$3.569e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.612e-03$			$1.686e-02$		
20	$5.00e-02$	$8.960e-04$	2.0	$3.705e-01$	$4.635e-03$	1.9	$1.229e+00$
40	$2.50e-02$	$2.239e-04$	2.0	$3.591e-01$	$1.215e-03$	1.9	$1.510e+00$
80	$1.25e-02$	$5.595e-05$	2.0	$3.591e-01$	$3.111e-04$	2.0	$1.713e+00$
160	$6.25e-03$	$1.399e-05$	2.0	$3.581e-01$	$7.870e-05$	2.0	$1.847e+00$
320	$3.13e-03$	$3.497e-06$	2.0	$3.582e-01$	$1.979e-05$	2.0	$1.929e+00$

Table 142: Numerical experiment `ewa3212` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.540e-02$			$1.540e-02$		
20	$5.00e-02$	$4.266e-03$	1.9	$1.095e+00$	$4.266e-03$	1.9	$1.095e+00$
40	$2.50e-02$	$1.180e-03$	1.9	$1.102e+00$	$1.180e-03$	1.9	$1.102e+00$
80	$1.25e-02$	$3.259e-04$	1.9	$1.112e+00$	$3.259e-04$	1.9	$1.112e+00$
160	$6.25e-03$	$8.939e-05$	1.9	$1.160e+00$	$8.939e-05$	1.9	$1.160e+00$
320	$3.13e-03$	$2.434e-05$	1.9	$1.223e+00$	$2.434e-05$	1.9	$1.223e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.915e-03$			$1.975e-03$		
20	$5.00e-02$	$4.769e-04$	2.0	$1.938e-01$	$4.878e-04$	2.0	$2.054e-01$
40	$2.50e-02$	$1.191e-04$	2.0	$1.915e-01$	$1.207e-04$	2.0	$2.040e-01$
80	$1.25e-02$	$2.977e-05$	2.0	$1.908e-01$	$2.999e-05$	2.0	$1.998e-01$
160	$6.25e-03$	$7.444e-06$	2.0	$1.904e-01$	$7.471e-06$	2.0	$1.962e-01$
320	$3.13e-03$	$1.861e-06$	2.0	$1.906e-01$	$1.864e-06$	2.0	$1.937e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.541e-03$			$6.541e-03$		
20	$5.00e-02$	$2.005e-03$	1.7	$3.324e-01$	$2.005e-03$	1.7	$3.324e-01$
40	$2.50e-02$	$5.964e-04$	1.7	$3.780e-01$	$5.964e-04$	1.7	$3.780e-01$
80	$1.25e-02$	$1.730e-04$	1.8	$4.322e-01$	$1.730e-04$	1.8	$4.322e-01$
160	$6.25e-03$	$4.926e-05$	1.8	$4.870e-01$	$4.926e-05$	1.8	$4.870e-01$
320	$3.13e-03$	$1.382e-05$	1.8	$5.428e-01$	$1.382e-05$	1.8	$5.428e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.983e-05$			$3.646e-04$		
20	$5.00e-02$	$2.864e-06$	3.4	$7.168e-02$	$4.981e-05$	2.9	$2.715e-01$
40	$2.50e-02$	$2.793e-07$	3.4	$6.699e-02$	$6.511e-06$	2.9	$3.283e-01$
80	$1.25e-02$	$2.745e-08$	3.3	$6.431e-02$	$8.325e-07$	3.0	$3.697e-01$
160	$6.25e-03$	$2.708e-09$	3.3	$6.269e-02$	$1.052e-07$	3.0	$3.969e-01$
320	$3.13e-03$	$2.678e-10$	3.3	$6.167e-02$	$1.323e-08$	3.0	$4.136e-01$

Table 143: Numerical experiment `ewa3212` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.047e-04$			$1.047e-04$		
20	$5.00e-02$	$8.318e-06$	3.7	$4.717e-01$	$8.318e-06$	3.7	$4.717e-01$
40	$2.50e-02$	$7.620e-07$	3.4	$2.549e-01$	$7.620e-07$	3.4	$2.549e-01$
80	$1.25e-02$	$4.176e-08$	4.2	$3.926e+00$	$4.176e-08$	4.2	$3.926e+00$
160	$6.25e-03$	$4.610e-09$	3.2	$4.695e-02$	$4.610e-09$	3.2	$4.695e-02$
320	$3.13e-03$	$5.369e-10$	3.1	$3.169e-02$	$5.369e-10$	3.1	$3.169e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.886e-06$			$2.465e-05$		
20	$5.00e-02$	$3.055e-07$	4.0	$4.881e-02$	$1.706e-06$	3.9	$1.756e-01$
40	$2.50e-02$	$1.906e-08$	4.0	$4.925e-02$	$1.123e-07$	3.9	$2.187e-01$
80	$1.25e-02$	$1.191e-09$	4.0	$4.876e-02$	$7.200e-09$	4.0	$2.506e-01$
160	$6.25e-03$	$7.446e-11$	4.0	$4.879e-02$	$4.558e-10$	4.0	$2.718e-01$
320	$3.13e-03$	$4.626e-12$	4.0	$5.103e-02$	$2.868e-11$	4.0	$2.846e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.697e-04$			$1.697e-04$		
20	$5.00e-02$	$1.025e-05$	4.0	$1.903e+00$	$1.025e-05$	4.0	$1.903e+00$
40	$2.50e-02$	$2.236e-06$	2.2	$7.390e-03$	$2.236e-06$	2.2	$7.390e-03$
80	$1.25e-02$	$1.741e-07$	3.7	$1.776e+00$	$1.741e-07$	3.7	$1.776e+00$
160	$6.25e-03$	$1.437e-08$	3.6	$1.233e+00$	$1.751e-08$	3.3	$3.528e-01$
320	$3.13e-03$	$1.789e-09$	3.0	$6.038e-02$	$2.105e-09$	3.1	$9.554e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.957e-06$			$8.772e-06$		
20	$5.00e-02$	$1.016e-07$	4.3	$3.627e-02$	$6.071e-07$	3.9	$6.252e-02$
40	$2.50e-02$	$5.644e-09$	4.2	$2.705e-02$	$3.993e-08$	3.9	$7.787e-02$
80	$1.25e-02$	$3.461e-10$	4.0	$1.598e-02$	$2.560e-09$	4.0	$8.920e-02$
160	$6.25e-03$	$2.010e-11$	4.1	$2.255e-02$	$1.621e-10$	4.0	$9.672e-02$
320	$3.13e-03$	$1.231e-12$	4.0	$1.526e-02$	$1.020e-11$	4.0	$1.011e-01$

Table 144: Numerical experiment `ewa3212` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.471e-05$			$1.471e-05$		
20	$5.00e-02$	$1.009e-06$	3.9	$1.081e-01$	$1.009e-06$	3.9	$1.081e-01$
40	$2.50e-02$	$7.031e-08$	3.8	$1.008e-01$	$7.031e-08$	3.8	$1.008e-01$
80	$1.25e-02$	$4.841e-09$	3.9	$1.076e-01$	$4.841e-09$	3.9	$1.076e-01$
160	$6.25e-03$	$3.115e-10$	4.0	$1.648e-01$	$3.115e-10$	4.0	$1.648e-01$
320	$3.13e-03$	$5.732e-11$	2.4	$7.525e-05$	$5.732e-11$	2.4	$7.525e-05$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.083e-06$			$2.185e-06$		
20	$5.00e-02$	$1.298e-07$	4.0	$2.104e-02$	$1.344e-07$	4.0	$2.301e-02$
40	$2.50e-02$	$8.108e-09$	4.0	$2.084e-02$	$8.276e-09$	4.0	$2.296e-02$
80	$1.25e-02$	$5.073e-10$	4.0	$2.065e-02$	$5.123e-10$	4.0	$2.230e-02$
160	$6.25e-03$	$3.171e-11$	4.0	$2.077e-02$	$3.189e-11$	4.0	$2.152e-02$
320	$3.13e-03$	$2.067e-12$	3.9	$1.527e-02$	$2.081e-12$	3.9	$1.522e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.405e-06$			$3.405e-06$		
20	$5.00e-02$	$2.543e-07$	3.7	$1.884e-02$	$2.543e-07$	3.7	$1.884e-02$
40	$2.50e-02$	$1.840e-08$	3.8	$2.160e-02$	$1.840e-08$	3.8	$2.160e-02$
80	$1.25e-02$	$1.302e-09$	3.8	$2.434e-02$	$1.302e-09$	3.8	$2.434e-02$
160	$6.25e-03$	$9.334e-11$	3.8	$2.242e-02$	$9.334e-11$	3.8	$2.242e-02$
320	$3.13e-03$	$6.879e-12$	3.8	$1.830e-02$	$6.879e-12$	3.8	$1.830e-02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.453e-09$			$1.681e-07$		
20	$5.00e-02$	$1.439e-10$	5.5	$1.978e-03$	$5.839e-09$	4.8	$1.183e-02$
40	$2.50e-02$	$3.482e-12$	5.4	$1.392e-03$	$1.924e-10$	4.9	$1.485e-02$
80	$1.25e-02$	$8.494e-14$	5.4	$1.333e-03$	$6.176e-12$	5.0	$1.710e-02$
160	$6.25e-03$	$5.773e-15$	3.9	$2.047e-06$	$1.985e-13$	5.0	$1.693e-02$
320	$3.13e-03$	$1.066e-14$	-0.9	$6.484e-17$	$1.066e-14$	4.2	$3.957e-04$

Table 145: Numerical experiment `ewa3212` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.991e-07$			$1.991e-07$		
20	$5.00e-02$	$2.503e-09$	6.3	$4.105e-01$	$2.503e-09$	6.3	$4.105e-01$
40	$2.50e-02$	$7.020e-11$	5.2	$1.278e-02$	$7.020e-11$	5.2	$1.278e-02$
80	$1.25e-02$	$1.386e-11$	2.3	$3.936e-07$	$1.386e-11$	2.3	$3.936e-07$
160	$6.25e-03$	$4.925e-11$	-1.8	$4.589e-15$	$4.925e-11$	-1.8	$4.589e-15$
320	$3.13e-03$	$2.966e-10$	-2.6	$9.611e-17$	$2.966e-10$	-2.6	$9.611e-17$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.129e-09$			$2.115e-08$		
20	$5.00e-02$	$6.410e-11$	6.0	$4.217e-03$	$3.705e-10$	5.8	$1.449e-02$
40	$2.50e-02$	$1.039e-12$	5.9	$3.502e-03$	$6.125e-12$	5.9	$1.857e-02$
80	$1.25e-02$	$8.793e-14$	3.6	$5.298e-07$	$8.793e-14$	6.1	$3.937e-02$
160	$6.25e-03$	$6.417e-14$	0.5	$6.441e-13$	$6.417e-14$	0.5	$6.441e-13$
320	$3.13e-03$	$1.137e-13$	-0.8	$9.745e-16$	$1.137e-13$	-0.8	$9.745e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3212	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid **tau**			Error for $\boldsymbol{x}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.540e-07$			$1.540e-07$		
20	$5.00e-02$	$4.462e-09$	5.1	$1.979e-02$	$4.462e-09$	5.1	$1.979e-02$
40	$2.50e-02$	$8.517e-11$	5.7	$1.202e-01$	$8.517e-11$	5.7	$1.202e-01$
80	$1.25e-02$	$2.458e-12$	5.1	$1.332e-02$	$2.458e-12$	5.1	$1.332e-02$
160	$6.25e-03$	$6.442e-12$	-1.4	$5.560e-15$	$6.442e-12$	-1.4	$5.560e-15$
320	$3.13e-03$	$4.861e-11$	-2.9	$2.412e-18$	$4.861e-11$	-2.9	$2.412e-18$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid **tau**			Error for $\boldsymbol{u}$ at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.580e-10$			$3.080e-09$		
20	$5.00e-02$	$8.790e-12$	6.0	$5.430e-04$	$5.404e-11$	5.8	$2.097e-03$
40	$2.50e-02$	$1.194e-13$	6.2	$1.031e-03$	$8.931e-13$	5.9	$2.714e-03$
80	$1.25e-02$	$1.665e-14$	2.8	$4.260e-09$	$2.176e-14$	5.4	$3.438e-04$
160	$6.25e-03$	$3.753e-14$	-1.2	$9.794e-17$	$3.864e-14$	-0.8	$5.774e-16$
320	$3.13e-03$	$9.259e-14$	-1.3	$5.039e-17$	$9.259e-14$	-1.3	$6.422e-17$

Table 146: Numerical experiment `ewa3212` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	1	e	no

Uniform Mesh		**Error for $\boldsymbol{x}$ at Grid `tau`**			**Error for $\boldsymbol{x}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.675e-02$			$7.675e-02$		
20	$5.00e-02$	$2.662e-02$	1.5	$2.585e+00$	$2.662e-02$	1.5	$2.585e+00$
40	$2.50e-02$	$8.376e-03$	1.7	$3.944e+00$	$8.376e-03$	1.7	$3.944e+00$
80	$1.25e-02$	$2.519e-03$	1.7	$5.017e+00$	$2.519e-03$	1.7	$5.017e+00$
160	$6.25e-03$	$7.543e-04$	1.7	$5.147e+00$	$7.543e-04$	1.7	$5.147e+00$
320	$3.13e-03$	$2.292e-04$	1.7	$4.621e+00$	$2.292e-04$	1.7	$4.621e+00$

Uniform Mesh		**Error for $\boldsymbol{u}$ at Grid `tau`**			**Error for $\boldsymbol{u}$ at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.999e-03$			$2.698e-02$		
20	$5.00e-02$	$9.972e-04$	2.0	$4.032e-01$	$7.569e-03$	1.8	$1.839e+00$
40	$2.50e-02$	$2.484e-04$	2.0	$4.048e-01$	$2.004e-03$	1.9	$2.359e+00$
80	$1.25e-02$	$6.213e-05$	2.0	$3.969e-01$	$5.158e-04$	2.0	$2.750e+00$
160	$6.25e-03$	$1.553e-05$	2.0	$3.982e-01$	$1.308e-04$	2.0	$3.013e+00$
320	$3.13e-03$	$3.882e-06$	2.0	$3.977e-01$	$3.294e-05$	2.0	$3.177e+00$

Table 147: Numerical experiment `ewa32125` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.978e-02$			$6.978e-02$		
20	$5.00e-02$	$3.112e-02$	1.2	$1.021e+00$	$3.112e-02$	1.2	$1.021e+00$
40	$2.50e-02$	$1.524e-02$	1.0	$6.803e-01$	$1.524e-02$	1.0	$6.803e-01$
80	$1.25e-02$	$7.887e-03$	1.0	$5.078e-01$	$7.887e-03$	1.0	$5.078e-01$
160	$6.25e-03$	$4.205e-03$	0.9	$4.203e-01$	$4.205e-03$	0.9	$4.203e-01$
320	$3.13e-03$	$2.279e-03$	0.9	$3.736e-01$	$2.279e-03$	0.9	$3.736e-01$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.552e-03$			$3.737e-03$		
20	$5.00e-02$	$8.970e-04$	2.0	$3.436e-01$	$9.195e-04$	2.0	$3.941e-01$
40	$2.50e-02$	$2.242e-04$	2.0	$3.595e-01$	$2.275e-04$	2.0	$3.848e-01$
80	$1.25e-02$	$5.610e-05$	2.0	$3.567e-01$	$5.648e-05$	2.0	$3.775e-01$
160	$6.25e-03$	$1.402e-05$	2.0	$3.591e-01$	$1.407e-05$	2.0	$3.691e-01$
320	$3.13e-03$	$3.506e-06$	2.0	$3.590e-01$	$3.512e-06$	2.0	$3.650e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.867e-02$			$4.867e-02$		
20	$5.00e-02$	$2.443e-02$	1.0	$4.803e-01$	$2.443e-02$	1.0	$4.803e-01$
40	$2.50e-02$	$1.273e-02$	0.9	$4.090e-01$	$1.273e-02$	0.9	$4.090e-01$
80	$1.25e-02$	$6.790e-03$	0.9	$3.612e-01$	$6.790e-03$	0.9	$3.612e-01$
160	$6.25e-03$	$3.673e-03$	0.9	$3.303e-01$	$3.673e-03$	0.9	$3.303e-01$
320	$3.13e-03$	$2.004e-03$	0.9	$3.107e-01$	$2.004e-03$	0.9	$3.107e-01$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.591e-04$			$7.919e-04$		
20	$5.00e-02$	$7.358e-05$	2.3	$6.953e-02$	$1.108e-04$	2.8	$5.446e-01$
40	$2.50e-02$	$1.533e-05$	2.3	$6.472e-02$	$1.533e-05$	2.9	$5.720e-01$
80	$1.25e-02$	$3.204e-06$	2.3	$6.362e-02$	$3.204e-06$	2.3	$6.362e-02$
160	$6.25e-03$	$6.689e-07$	2.3	$6.399e-02$	$6.689e-07$	2.3	$6.399e-02$
320	$3.13e-03$	$1.394e-07$	2.3	$6.496e-02$	$1.394e-07$	2.3	$6.496e-02$

Table 148: Numerical experiment `ewa32125` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.493e-03$			$3.493e-03$		
20	$5.00e-02$	$1.161e-03$	1.6	$1.357e-01$	$1.161e-03$	1.6	$1.357e-01$
40	$2.50e-02$	$4.081e-04$	1.5	$1.065e-01$	$4.081e-04$	1.5	$1.065e-01$
80	$1.25e-02$	$1.441e-04$	1.5	$1.041e-01$	$1.441e-04$	1.5	$1.041e-01$
160	$6.25e-03$	$5.091e-05$	1.5	$1.033e-01$	$5.091e-05$	1.5	$1.033e-01$
320	$3.13e-03$	$1.800e-05$	1.5	$1.031e-01$	$1.800e-05$	1.5	$1.031e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.673e-05$			$7.293e-05$		
20	$5.00e-02$	$6.403e-06$	2.5	$1.217e-02$	$6.403e-06$	3.5	$2.358e-01$
40	$2.50e-02$	$1.133e-06$	2.5	$1.142e-02$	$1.133e-06$	2.5	$1.142e-02$
80	$1.25e-02$	$2.002e-07$	2.5	$1.145e-02$	$2.002e-07$	2.5	$1.145e-02$
160	$6.25e-03$	$3.540e-08$	2.5	$1.146e-02$	$3.540e-08$	2.5	$1.146e-02$
320	$3.13e-03$	$6.257e-09$	2.5	$1.146e-02$	$6.257e-09$	2.5	$1.146e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.086e-03$			$3.086e-03$		
20	$5.00e-02$	$1.012e-03$	1.6	$1.253e-01$	$1.012e-03$	1.6	$1.253e-01$
40	$2.50e-02$	$3.547e-04$	1.5	$9.391e-02$	$3.547e-04$	1.5	$9.391e-02$
80	$1.25e-02$	$1.253e-04$	1.5	$9.017e-02$	$1.253e-04$	1.5	$9.017e-02$
160	$6.25e-03$	$4.428e-05$	1.5	$8.987e-02$	$4.428e-05$	1.5	$8.987e-02$
320	$3.13e-03$	$1.565e-05$	1.5	$8.969e-02$	$1.565e-05$	1.5	$8.969e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.164e-05$			$2.550e-05$		
20	$5.00e-02$	$3.724e-06$	2.5	$7.483e-03$	$3.724e-06$	2.8	$1.520e-02$
40	$2.50e-02$	$6.569e-07$	2.5	$6.718e-03$	$6.569e-07$	2.5	$6.718e-03$
80	$1.25e-02$	$1.161e-07$	2.5	$6.646e-03$	$1.161e-07$	2.5	$6.646e-03$
160	$6.25e-03$	$2.053e-08$	2.5	$6.652e-03$	$2.053e-08$	2.5	$6.652e-03$
320	$3.13e-03$	$3.629e-09$	2.5	$6.649e-03$	$3.629e-09$	2.5	$6.649e-03$

Table 149: Numerical experiment `ewa32125` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.923e-03$			$1.923e-03$		
20	$5.00e-02$	$6.859e-04$	1.5	$5.904e-02$	$6.859e-04$	1.5	$5.904e-02$
40	$2.50e-02$	$2.485e-04$	1.5	$5.524e-02$	$2.485e-04$	1.5	$5.524e-02$
80	$1.25e-02$	$9.000e-05$	1.5	$5.526e-02$	$9.000e-05$	1.5	$5.526e-02$
160	$6.25e-03$	$3.250e-05$	1.5	$5.633e-02$	$3.250e-05$	1.5	$5.633e-02$
320	$3.13e-03$	$1.170e-05$	1.5	$5.766e-02$	$1.170e-05$	1.5	$5.766e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.258e-05$			$1.258e-05$		
20	$5.00e-02$	$2.248e-06$	2.5	$3.840e-03$	$2.248e-06$	2.5	$3.840e-03$
40	$2.50e-02$	$4.022e-07$	2.5	$3.818e-03$	$4.022e-07$	2.5	$3.818e-03$
80	$1.25e-02$	$7.171e-08$	2.5	$3.890e-03$	$7.171e-08$	2.5	$3.890e-03$
160	$6.25e-03$	$1.275e-08$	2.5	$3.965e-03$	$1.275e-08$	2.5	$3.965e-03$
320	$3.13e-03$	$2.261e-09$	2.5	$4.024e-03$	$2.261e-09$	2.5	$4.024e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.422e-03$			$1.422e-03$		
20	$5.00e-02$	$5.148e-04$	1.5	$4.155e-02$	$5.148e-04$	1.5	$4.155e-02$
40	$2.50e-02$	$1.871e-04$	1.5	$4.087e-02$	$1.871e-04$	1.5	$4.087e-02$
80	$1.25e-02$	$6.783e-05$	1.5	$4.140e-02$	$6.783e-05$	1.5	$4.140e-02$
160	$6.25e-03$	$2.451e-05$	1.5	$4.232e-02$	$2.451e-05$	1.5	$4.232e-02$
320	$3.13e-03$	$8.826e-06$	1.5	$4.333e-02$	$8.826e-06$	1.5	$4.333e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.544e-06$			$5.544e-06$		
20	$5.00e-02$	$9.920e-07$	2.5	$1.684e-03$	$9.920e-07$	2.5	$1.684e-03$
40	$2.50e-02$	$1.776e-07$	2.5	$1.681e-03$	$1.776e-07$	2.5	$1.681e-03$
80	$1.25e-02$	$3.167e-08$	2.5	$1.714e-03$	$3.167e-08$	2.5	$1.714e-03$
160	$6.25e-03$	$5.631e-09$	2.5	$1.747e-03$	$5.631e-09$	2.5	$1.747e-03$
320	$3.13e-03$	$9.992e-10$	2.5	$1.774e-03$	$9.992e-10$	2.5	$1.774e-03$

Table 150: Numerical experiment `ewa32125` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.772e-04$			$9.772e-04$		
20	$5.00e-02$	$3.485e-04$	1.5	$3.001e-02$	$3.485e-04$	1.5	$3.001e-02$
40	$2.50e-02$	$1.235e-04$	1.5	$3.088e-02$	$1.235e-04$	1.5	$3.088e-02$
80	$1.25e-02$	$4.370e-05$	1.5	$3.111e-02$	$4.370e-05$	1.5	$3.111e-02$
160	$6.25e-03$	$1.545e-05$	1.5	$3.121e-02$	$1.545e-05$	1.5	$3.121e-02$
320	$3.13e-03$	$5.464e-06$	1.5	$3.126e-02$	$5.464e-06$	1.5	$3.126e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.049e-06$			$5.049e-06$		
20	$5.00e-02$	$9.039e-07$	2.5	$1.531e-03$	$9.039e-07$	2.5	$1.531e-03$
40	$2.50e-02$	$1.604e-07$	2.5	$1.591e-03$	$1.604e-07$	2.5	$1.591e-03$
80	$1.25e-02$	$2.839e-08$	2.5	$1.612e-03$	$2.839e-08$	2.5	$1.612e-03$
160	$6.25e-03$	$5.021e-09$	2.5	$1.620e-03$	$5.021e-09$	2.5	$1.620e-03$
320	$3.13e-03$	$8.878e-10$	2.5	$1.624e-03$	$8.878e-10$	2.5	$1.624e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32125	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.764e-04$			$6.764e-04$		
20	$5.00e-02$	$2.407e-04$	1.5	$2.094e-02$	$2.407e-04$	1.5	$2.094e-02$
40	$2.50e-02$	$8.518e-05$	1.5	$2.142e-02$	$8.518e-05$	1.5	$2.142e-02$
80	$1.25e-02$	$3.013e-05$	1.5	$2.149e-02$	$3.013e-05$	1.5	$2.149e-02$
160	$6.25e-03$	$1.066e-05$	1.5	$2.153e-02$	$1.066e-05$	1.5	$2.153e-02$
320	$3.13e-03$	$3.768e-06$	1.5	$2.155e-02$	$3.768e-06$	1.5	$2.155e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.817e-06$			$1.817e-06$		
20	$5.00e-02$	$3.238e-07$	2.5	$5.593e-04$	$3.238e-07$	2.5	$5.593e-04$
40	$2.50e-02$	$5.736e-08$	2.5	$5.738e-04$	$5.736e-08$	2.5	$5.738e-04$
80	$1.25e-02$	$1.015e-08$	2.5	$5.779e-04$	$1.015e-08$	2.5	$5.779e-04$
160	$6.25e-03$	$1.794e-09$	2.5	$5.797e-04$	$1.794e-09$	2.5	$5.797e-04$
320	$3.13e-03$	$3.173e-10$	2.5	$5.806e-04$	$3.173e-10$	2.5	$5.806e-04$

Table 151: Numerical experiment `ewa32125` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.870e-01$			$1.870e-01$		
20	$5.00e-02$	$4.979e-02$	1.9	$1.516e+01$	$4.979e-02$	1.9	$1.516e+01$
40	$2.50e-02$	$1.260e-02$	2.0	$1.888e+01$	$1.260e-02$	2.0	$1.888e+01$
80	$1.25e-02$	$3.240e-03$	2.0	$1.738e+01$	$3.240e-03$	2.0	$1.738e+01$
160	$6.25e-03$	$8.486e-04$	1.9	$1.546e+01$	$8.486e-04$	1.9	$1.546e+01$
320	$3.13e-03$	$2.171e-04$	2.0	$1.834e+01$	$2.171e-04$	2.0	$1.834e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.231e-03$			$3.887e-02$		
20	$5.00e-02$	$1.035e-03$	2.0	$4.551e-01$	$1.112e-02$	1.8	$2.480e+00$
40	$2.50e-02$	$2.580e-04$	2.0	$4.189e-01$	$2.976e-03$	1.9	$3.319e+00$
80	$1.25e-02$	$6.445e-05$	2.0	$4.147e-01$	$7.697e-04$	2.0	$3.974e+00$
160	$6.25e-03$	$1.611e-05$	2.0	$4.129e-01$	$1.957e-04$	2.0	$4.424e+00$
320	$3.13e-03$	$4.027e-06$	2.0	$4.126e-01$	$4.935e-05$	2.0	$4.708e+00$

Table 152: Numerical experiment `ewa3213` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.086e-01$			$1.086e-01$		
20	$5.00e-02$	$4.588e-02$	1.2	$1.897e+00$	$4.588e-02$	1.2	$1.897e+00$
40	$2.50e-02$	$2.111e-02$	1.1	$1.313e+00$	$2.111e-02$	1.1	$1.313e+00$
80	$1.25e-02$	$1.012e-02$	1.1	$1.059e+00$	$1.012e-02$	1.1	$1.059e+00$
160	$6.25e-03$	$4.950e-03$	1.0	$9.287e-01$	$4.950e-03$	1.0	$9.287e-01$
320	$3.13e-03$	$2.448e-03$	1.0	$8.586e-01$	$2.448e-03$	1.0	$8.586e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.779e-03$			$6.070e-03$		
20	$5.00e-02$	$1.455e-03$	2.0	$5.640e-01$	$1.498e-03$	2.0	$6.333e-01$
40	$2.50e-02$	$3.655e-04$	2.0	$5.711e-01$	$3.704e-04$	2.0	$6.286e-01$
80	$1.25e-02$	$9.137e-05$	2.0	$5.847e-01$	$9.205e-05$	2.0	$6.119e-01$
160	$6.25e-03$	$2.285e-05$	2.0	$5.839e-01$	$2.293e-05$	2.0	$6.025e-01$
320	$3.13e-03$	$5.712e-06$	2.0	$5.849e-01$	$5.723e-06$	2.0	$5.948e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.185e-02$			$7.185e-02$		
20	$5.00e-02$	$3.467e-02$	1.1	$8.085e-01$	$3.467e-02$	1.1	$8.085e-01$
40	$2.50e-02$	$1.705e-02$	1.0	$7.453e-01$	$1.705e-02$	1.0	$7.453e-01$
80	$1.25e-02$	$8.455e-03$	1.0	$7.125e-01$	$8.455e-03$	1.0	$7.125e-01$
160	$6.25e-03$	$4.210e-03$	1.0	$6.943e-01$	$4.210e-03$	1.0	$6.943e-01$
320	$3.13e-03$	$2.101e-03$	1.0	$6.839e-01$	$2.101e-03$	1.0	$6.839e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.780e-04$			$1.438e-03$		
20	$5.00e-02$	$6.508e-05$	2.5	$1.305e-01$	$2.060e-04$	2.8	$9.146e-01$
40	$2.50e-02$	$1.140e-05$	2.5	$1.211e-01$	$2.761e-05$	2.9	$1.220e+00$
80	$1.25e-02$	$2.009e-06$	2.5	$1.173e-01$	$3.575e-06$	2.9	$1.465e+00$
160	$6.25e-03$	$3.547e-07$	2.5	$1.158e-01$	$4.548e-07$	3.0	$1.637e+00$
320	$3.13e-03$	$6.268e-08$	2.5	$1.152e-01$	$6.268e-08$	2.9	$9.122e-01$

Table 153: Numerical experiment `ewa3213` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.755e-03$			$1.755e-03$		
20	$5.00e-02$	$1.108e-04$	4.0	$1.698e+01$	$1.108e-04$	4.0	$1.698e+01$
40	$2.50e-02$	$7.131e-06$	4.0	$1.562e+01$	$7.131e-06$	4.0	$1.562e+01$
80	$1.25e-02$	$4.475e-07$	4.0	$1.787e+01$	$4.475e-07$	4.0	$1.787e+01$
160	$6.25e-03$	$2.801e-08$	4.0	$1.818e+01$	$2.801e-08$	4.0	$1.818e+01$
320	$3.13e-03$	$1.847e-09$	3.9	$1.237e+01$	$1.847e-09$	3.9	$1.237e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.463e-05$			$1.670e-04$		
20	$5.00e-02$	$8.927e-07$	4.0	$1.583e-01$	$1.231e-05$	3.8	$9.667e-01$
40	$2.50e-02$	$5.555e-08$	4.0	$1.456e-01$	$8.362e-07$	3.9	$1.372e+00$
80	$1.25e-02$	$3.470e-09$	4.0	$1.427e-01$	$5.451e-08$	3.9	$1.711e+00$
160	$6.25e-03$	$2.168e-10$	4.0	$1.424e-01$	$3.480e-09$	4.0	$1.954e+00$
320	$3.13e-03$	$1.353e-11$	4.0	$1.433e-01$	$2.198e-10$	4.0	$2.110e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.946e-04$			$8.946e-04$		
20	$5.00e-02$	$6.111e-05$	3.9	$6.657e+00$	$6.111e-05$	3.9	$6.657e+00$
40	$2.50e-02$	$3.829e-06$	4.0	$9.679e+00$	$3.829e-06$	4.0	$9.679e+00$
80	$1.25e-02$	$2.388e-07$	4.0	$9.917e+00$	$2.388e-07$	4.0	$9.917e+00$
160	$6.25e-03$	$1.494e-08$	4.0	$9.720e+00$	$1.494e-08$	4.0	$9.720e+00$
320	$3.13e-03$	$9.271e-10$	4.0	$1.030e+01$	$9.271e-10$	4.0	$1.030e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.611e-07$			$5.737e-05$		
20	$5.00e-02$	$2.734e-08$	4.8	$4.790e-02$	$4.301e-06$	3.7	$3.136e-01$
40	$2.50e-02$	$9.835e-10$	4.8	$4.763e-02$	$2.947e-07$	3.9	$4.619e-01$
80	$1.25e-02$	$3.654e-11$	4.8	$4.010e-02$	$1.930e-08$	3.9	$5.893e-01$
160	$6.25e-03$	$1.389e-12$	4.7	$3.473e-02$	$1.235e-09$	4.0	$6.821e-01$
320	$3.13e-03$	$1.394e-13$	3.3	$2.829e-05$	$7.807e-11$	4.0	$7.428e-01$

Table 154: Numerical experiment `ewa3213` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.687e-04$			$1.687e-04$		
20	$5.00e-02$	$1.374e-05$	3.6	$7.007e-01$	$1.374e-05$	3.6	$7.007e-01$
40	$2.50e-02$	$1.147e-06$	3.6	$6.278e-01$	$1.147e-06$	3.6	$6.278e-01$
80	$1.25e-02$	$9.711e-08$	3.6	$5.844e-01$	$9.711e-08$	3.6	$5.844e-01$
160	$6.25e-03$	$8.340e-09$	3.5	$5.333e-01$	$8.340e-09$	3.5	$5.333e-01$
320	$3.13e-03$	$8.354e-10$	3.3	$1.729e-01$	$8.354e-10$	3.3	$1.729e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.948e-05$			$2.053e-05$		
20	$5.00e-02$	$1.224e-06$	4.0	$1.913e-01$	$1.269e-06$	4.0	$2.130e-01$
40	$2.50e-02$	$7.661e-08$	4.0	$1.947e-01$	$7.822e-08$	4.0	$2.152e-01$
80	$1.25e-02$	$4.796e-09$	4.0	$1.945e-01$	$4.844e-09$	4.0	$2.103e-01$
160	$6.25e-03$	$2.998e-10$	4.0	$1.962e-01$	$3.014e-10$	4.0	$2.041e-01$
320	$3.13e-03$	$1.884e-11$	4.0	$1.887e-01$	$1.890e-11$	4.0	$1.927e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.889e-05$			$4.889e-05$		
20	$5.00e-02$	$4.425e-06$	3.5	$1.428e-01$	$4.425e-06$	3.5	$1.428e-01$
40	$2.50e-02$	$4.001e-07$	3.5	$1.436e-01$	$4.001e-07$	3.5	$1.436e-01$
80	$1.25e-02$	$3.601e-08$	3.5	$1.470e-01$	$3.601e-08$	3.5	$1.470e-01$
160	$6.25e-03$	$3.229e-09$	3.5	$1.506e-01$	$3.229e-09$	3.5	$1.506e-01$
320	$3.13e-03$	$2.924e-10$	3.5	$1.402e-01$	$2.924e-10$	3.5	$1.402e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.428e-08$			$2.000e-06$		
20	$5.00e-02$	$1.933e-09$	5.1	$7.305e-03$	$7.534e-08$	4.7	$1.074e-01$
40	$2.50e-02$	$5.944e-11$	5.0	$6.626e-03$	$2.590e-09$	4.9	$1.598e-01$
80	$1.25e-02$	$1.843e-12$	5.0	$6.338e-03$	$8.491e-11$	4.9	$2.054e-01$
160	$6.25e-03$	$5.865e-14$	5.0	$5.395e-03$	$2.715e-12$	5.0	$2.405e-01$
320	$3.13e-03$	$5.329e-15$	3.5	$2.482e-06$	$8.615e-14$	5.0	$2.546e-01$

Table 155: Numerical experiment `ewa3213` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.552e-06$			$6.552e-06$		
20	$5.00e-02$	$1.189e-07$	5.8	$3.985e+00$	$1.189e-07$	5.8	$3.985e+00$
40	$2.50e-02$	$1.823e-09$	6.0	$8.262e+00$	$1.823e-09$	6.0	$8.262e+00$
80	$1.25e-02$	$3.915e-11$	5.5	$1.373e+00$	$3.915e-11$	5.5	$1.373e+00$
160	$6.25e-03$	$1.196e-10$	-1.6	$3.368e-14$	$1.196e-10$	-1.6	$3.368e-14$
320	$3.13e-03$	$6.804e-10$	-2.5	$3.534e-16$	$6.804e-10$	-2.5	$3.534e-16$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.176e-08$			$4.635e-07$		
20	$5.00e-02$	$6.397e-10$	6.0	$4.461e-02$	$8.819e-09$	5.7	$2.408e-01$
40	$2.50e-02$	$9.977e-12$	6.0	$4.126e-02$	$1.523e-10$	5.9	$3.663e-01$
80	$1.25e-02$	$1.708e-13$	5.9	$2.517e-02$	$2.476e-12$	5.9	$5.047e-01$
160	$6.25e-03$	$7.727e-14$	1.1	$2.566e-11$	$7.727e-14$	5.0	$8.188e-03$
320	$3.13e-03$	$1.372e-13$	-0.8	$1.153e-15$	$1.372e-13$	-0.8	$1.153e-15$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3213	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.405e-06$			$1.405e-06$		
20	$5.00e-02$	$2.761e-08$	5.7	$6.560e-01$	$2.761e-08$	5.7	$6.560e-01$
40	$2.50e-02$	$4.862e-10$	5.8	$1.053e+00$	$4.862e-10$	5.8	$1.053e+00$
80	$1.25e-02$	$1.440e-11$	5.1	$6.627e-02$	$1.440e-11$	5.1	$6.627e-02$
160	$6.25e-03$	$2.594e-11$	-0.8	$3.486e-13$	$2.594e-11$	-0.8	$3.486e-13$
320	$3.13e-03$	$4.180e-11$	-0.7	$7.882e-13$	$4.180e-11$	-0.7	$7.882e-13$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.318e-09$			$6.551e-08$		
20	$5.00e-02$	$1.924e-11$	6.1	$1.649e-03$	$1.267e-09$	5.7	$3.226e-02$
40	$2.50e-02$	$2.675e-13$	6.2	$2.042e-03$	$2.207e-11$	5.8	$5.073e-02$
80	$1.25e-02$	$1.932e-14$	3.8	$3.172e-07$	$3.642e-13$	5.9	$6.755e-02$
160	$6.25e-03$	$3.553e-14$	-0.9	$4.104e-16$	$3.553e-14$	3.4	$8.933e-07$
320	$3.13e-03$	$6.972e-14$	-1.0	$2.551e-16$	$6.972e-14$	-1.0	$2.551e-16$

Table 156: Numerical experiment `ewa3213` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.623e-01$			$3.623e-01$		
20	$5.00e-02$	$9.466e-02$	1.9	$3.127e+01$	$9.466e-02$	1.9	$3.127e+01$
40	$2.50e-02$	$2.411e-02$	2.0	$3.497e+01$	$2.411e-02$	2.0	$3.497e+01$
80	$1.25e-02$	$6.060e-03$	2.0	$3.746e+01$	$6.060e-03$	2.0	$3.746e+01$
160	$6.25e-03$	$1.518e-03$	2.0	$3.830e+01$	$1.518e-03$	2.0	$3.830e+01$
320	$3.13e-03$	$3.798e-04$	2.0	$3.860e+01$	$3.798e-04$	2.0	$3.860e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.337e-03$			$5.228e-02$		
20	$5.00e-02$	$1.044e-03$	2.1	$4.911e-01$	$1.526e-02$	1.8	$3.125e+00$
40	$2.50e-02$	$2.586e-04$	2.0	$4.354e-01$	$4.124e-03$	1.9	$4.360e+00$
80	$1.25e-02$	$6.449e-05$	2.0	$4.191e-01$	$1.072e-03$	1.9	$5.360e+00$
160	$6.25e-03$	$1.611e-05$	2.0	$4.143e-01$	$2.733e-04$	2.0	$6.063e+00$
320	$3.13e-03$	$4.028e-06$	2.0	$4.126e-01$	$6.900e-05$	2.0	$6.513e+00$

Table 157: Numerical experiment `ewa32135` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.516e-01$			$1.516e-01$		
20	$5.00e-02$	$5.988e-02$	1.3	$3.315e+00$	$5.988e-02$	1.3	$3.315e+00$
40	$2.50e-02$	$2.571e-02$	1.2	$2.312e+00$	$2.571e-02$	1.2	$2.312e+00$
80	$1.25e-02$	$1.144e-02$	1.2	$1.911e+00$	$1.144e-02$	1.2	$1.911e+00$
160	$6.25e-03$	$5.186e-03$	1.1	$1.704e+00$	$5.186e-03$	1.1	$1.704e+00$
320	$3.13e-03$	$2.373e-03$	1.1	$1.587e+00$	$2.373e-03$	1.1	$1.587e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.656e-03$			$8.853e-03$		
20	$5.00e-02$	$2.171e-03$	2.0	$8.563e-01$	$2.219e-03$	2.0	$8.771e-01$
40	$2.50e-02$	$5.433e-04$	2.0	$8.652e-01$	$5.510e-04$	2.0	$9.150e-01$
80	$1.25e-02$	$1.358e-04$	2.0	$8.682e-01$	$1.369e-04$	2.0	$9.101e-01$
160	$6.25e-03$	$3.398e-05$	2.0	$8.661e-01$	$3.411e-05$	2.0	$8.968e-01$
320	$3.13e-03$	$8.495e-06$	2.0	$8.698e-01$	$8.511e-06$	2.0	$8.844e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.404e-02$			$9.404e-02$		
20	$5.00e-02$	$4.325e-02$	1.1	$1.242e+00$	$4.325e-02$	1.1	$1.242e+00$
40	$2.50e-02$	$2.003e-02$	1.1	$1.203e+00$	$2.003e-02$	1.1	$1.203e+00$
80	$1.25e-02$	$9.286e-03$	1.1	$1.199e+00$	$9.286e-03$	1.1	$1.199e+00$
160	$6.25e-03$	$4.304e-03$	1.1	$1.201e+00$	$4.304e-03$	1.1	$1.201e+00$
320	$3.13e-03$	$1.994e-03$	1.1	$1.204e+00$	$1.994e-03$	1.1	$1.204e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.560e-04$			$2.329e-03$		
20	$5.00e-02$	$5.426e-05$	2.7	$1.843e-01$	$3.415e-04$	2.8	$1.372e+00$
40	$2.50e-02$	$8.440e-06$	2.7	$1.687e-01$	$4.633e-05$	2.9	$1.917e+00$
80	$1.25e-02$	$1.323e-06$	2.7	$1.622e-01$	$6.037e-06$	2.9	$2.377e+00$
160	$6.25e-03$	$2.078e-07$	2.7	$1.593e-01$	$7.705e-07$	3.0	$2.708e+00$
320	$3.13e-03$	$3.270e-08$	2.7	$1.579e-01$	$9.734e-08$	3.0	$2.922e+00$

Table 158: Numerical experiment `ewa32135` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.665e-03$			$4.665e-03$		
20	$5.00e-02$	$3.523e-04$	3.7	$2.488e+01$	$3.523e-04$	3.7	$2.488e+01$
40	$2.50e-02$	$2.888e-05$	3.6	$1.745e+01$	$2.888e-05$	3.6	$1.745e+01$
80	$1.25e-02$	$2.940e-06$	3.3	$5.511e+00$	$2.940e-06$	3.3	$5.511e+00$
160	$6.25e-03$	$3.832e-07$	2.9	$1.156e+00$	$3.832e-07$	2.9	$1.156e+00$
320	$3.13e-03$	$6.453e-08$	2.6	$1.773e-01$	$6.453e-08$	2.6	$1.773e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.880e-05$			$3.252e-04$		
20	$5.00e-02$	$1.124e-06$	4.1	$2.178e-01$	$2.471e-05$	3.7	$1.701e+00$
40	$2.50e-02$	$6.944e-08$	4.0	$1.890e-01$	$1.706e-06$	3.9	$2.571e+00$
80	$1.25e-02$	$5.580e-09$	3.6	$4.664e-02$	$1.121e-07$	3.9	$3.341e+00$
160	$6.25e-03$	$4.932e-10$	3.5	$2.556e-02$	$7.186e-09$	4.0	$3.914e+00$
320	$3.13e-03$	$4.360e-11$	3.5	$2.553e-02$	$4.549e-10$	4.0	$4.293e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.693e-03$			$2.693e-03$		
20	$5.00e-02$	$2.009e-04$	3.7	$1.498e+01$	$2.009e-04$	3.7	$1.498e+01$
40	$2.50e-02$	$1.845e-05$	3.4	$6.079e+00$	$1.845e-05$	3.4	$6.079e+00$
80	$1.25e-02$	$2.116e-06$	3.1	$1.870e+00$	$2.116e-06$	3.1	$1.870e+00$
160	$6.25e-03$	$3.089e-07$	2.8	$4.063e-01$	$3.089e-07$	2.8	$4.063e-01$
320	$3.13e-03$	$5.460e-08$	2.5	$1.001e-01$	$5.460e-08$	2.5	$1.001e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.405e-06$			$1.097e-04$		
20	$5.00e-02$	$3.857e-07$	3.5	$1.437e-02$	$8.556e-06$	3.7	$5.266e-01$
40	$2.50e-02$	$3.426e-08$	3.5	$1.351e-02$	$5.985e-07$	3.8	$8.413e-01$
80	$1.25e-02$	$3.029e-09$	3.5	$1.385e-02$	$3.960e-08$	3.9	$1.132e+00$
160	$6.25e-03$	$2.677e-10$	3.5	$1.387e-02$	$2.547e-09$	4.0	$1.354e+00$
320	$3.13e-03$	$2.366e-11$	3.5	$1.390e-02$	$1.615e-10$	4.0	$1.503e+00$

Table 159: Numerical experiment `ewa32135` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.658e-04$			$7.658e-04$		
20	$5.00e-02$	$7.904e-05$	3.3	$1.447e+00$	$7.904e-05$	3.3	$1.447e+00$
40	$2.50e-02$	$1.172e-05$	2.8	$3.018e-01$	$1.172e-05$	2.8	$3.018e-01$
80	$1.25e-02$	$2.215e-06$	2.4	$8.336e-02$	$2.215e-06$	2.4	$8.336e-02$
160	$6.25e-03$	$4.589e-07$	2.3	$4.647e-02$	$4.589e-07$	2.3	$4.647e-02$
320	$3.13e-03$	$9.760e-08$	2.2	$3.835e-02$	$9.760e-08$	2.2	$3.835e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.236e-05$			$4.355e-05$		
20	$5.00e-02$	$2.677e-06$	4.0	$4.083e-01$	$2.768e-06$	4.0	$4.116e-01$
40	$2.50e-02$	$1.679e-07$	4.0	$4.219e-01$	$1.716e-07$	4.0	$4.594e-01$
80	$1.25e-02$	$1.053e-08$	4.0	$4.234e-01$	$1.063e-08$	4.0	$4.609e-01$
160	$6.25e-03$	$6.580e-10$	4.0	$4.303e-01$	$6.614e-10$	4.0	$4.471e-01$
320	$3.13e-03$	$4.120e-11$	4.0	$4.260e-01$	$4.131e-11$	4.0	$4.355e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.382e-04$			$3.382e-04$		
20	$5.00e-02$	$4.233e-05$	3.0	$3.369e-01$	$4.233e-05$	3.0	$3.369e-01$
40	$2.50e-02$	$7.222e-06$	2.6	$8.826e-02$	$7.222e-06$	2.6	$8.826e-02$
80	$1.25e-02$	$1.443e-06$	2.3	$3.810e-02$	$1.443e-06$	2.3	$3.810e-02$
160	$6.25e-03$	$3.038e-07$	2.2	$2.734e-02$	$3.038e-07$	2.2	$2.734e-02$
320	$3.13e-03$	$6.493e-08$	2.2	$2.450e-02$	$6.493e-08$	2.2	$2.450e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.499e-07$			$4.688e-06$		
20	$5.00e-02$	$4.585e-08$	3.3	$8.865e-04$	$1.839e-07$	4.7	$2.203e-01$
40	$2.50e-02$	$4.334e-09$	3.4	$1.228e-03$	$6.454e-09$	4.8	$3.560e-01$
80	$1.25e-02$	$3.997e-10$	3.4	$1.399e-03$	$3.997e-10$	4.0	$1.735e-02$
160	$6.25e-03$	$3.645e-11$	3.5	$1.502e-03$	$3.645e-11$	3.5	$1.502e-03$
320	$3.13e-03$	$3.303e-12$	3.5	$1.575e-03$	$3.303e-12$	3.5	$1.575e-03$

Table 160: Numerical experiment `ewa32135` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.501e-05$			$6.501e-05$		
20	$5.00e-02$	$7.305e-06$	3.2	$9.260e-02$	$7.305e-06$	3.2	$9.260e-02$
40	$2.50e-02$	$1.240e-06$	2.6	$1.556e-02$	$1.240e-06$	2.6	$1.556e-02$
80	$1.25e-02$	$2.193e-07$	2.5	$1.255e-02$	$2.193e-07$	2.5	$1.255e-02$
160	$6.25e-03$	$3.877e-08$	2.5	$1.255e-02$	$3.877e-08$	2.5	$1.255e-02$
320	$3.13e-03$	$7.478e-09$	2.4	$6.625e-03$	$7.478e-09$	2.4	$6.625e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.512e-07$			$1.339e-06$		
20	$5.00e-02$	$2.220e-08$	3.5	$7.950e-04$	$2.654e-08$	5.7	$6.071e-01$
40	$2.50e-02$	$1.962e-09$	3.5	$7.938e-04$	$1.962e-09$	3.8	$2.053e-03$
80	$1.25e-02$	$1.735e-10$	3.5	$7.937e-04$	$1.735e-10$	3.5	$7.937e-04$
160	$6.25e-03$	$1.532e-11$	3.5	$7.973e-04$	$1.532e-11$	3.5	$7.973e-04$
320	$3.13e-03$	$1.306e-12$	3.6	$1.034e-03$	$1.306e-12$	3.6	$1.034e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32135	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.977e-05$			$2.977e-05$		
20	$5.00e-02$	$4.313e-06$	2.8	$1.824e-02$	$4.313e-06$	2.8	$1.824e-02$
40	$2.50e-02$	$7.568e-07$	2.5	$7.964e-03$	$7.568e-07$	2.5	$7.964e-03$
80	$1.25e-02$	$1.338e-07$	2.5	$7.655e-03$	$1.338e-07$	2.5	$7.655e-03$
160	$6.25e-03$	$2.366e-08$	2.5	$7.647e-03$	$2.366e-08$	2.5	$7.647e-03$
320	$3.13e-03$	$4.178e-09$	2.5	$7.717e-03$	$4.178e-09$	2.5	$7.717e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.501e-08$			$1.865e-07$		
20	$5.00e-02$	$6.688e-09$	3.5	$2.305e-04$	$6.688e-09$	4.8	$1.180e-02$
40	$2.50e-02$	$5.910e-10$	3.5	$2.395e-04$	$5.910e-10$	3.5	$2.395e-04$
80	$1.25e-02$	$5.223e-11$	3.5	$2.393e-04$	$5.223e-11$	3.5	$2.393e-04$
160	$6.25e-03$	$4.615e-12$	3.5	$2.399e-04$	$4.615e-12$	3.5	$2.399e-04$
320	$3.13e-03$	$4.135e-13$	3.5	$2.162e-04$	$4.135e-13$	3.5	$2.162e-04$

Table 161: Numerical experiment `ewa32135` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.833e-01$			$5.833e-01$		
20	$5.00e-02$	$1.547e-01$	1.9	$4.791e+01$	$1.547e-01$	1.9	$4.791e+01$
40	$2.50e-02$	$3.956e-02$	2.0	$5.616e+01$	$3.956e-02$	2.0	$5.616e+01$
80	$1.25e-02$	$9.947e-03$	2.0	$6.141e+01$	$9.947e-03$	2.0	$6.141e+01$
160	$6.25e-03$	$2.490e-03$	2.0	$6.308e+01$	$2.490e-03$	2.0	$6.308e+01$
320	$3.13e-03$	$6.228e-04$	2.0	$6.358e+01$	$6.228e-04$	2.0	$6.358e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.592e-03$			$6.701e-02$		
20	$5.00e-02$	$1.189e-03$	1.9	$4.091e-01$	$1.994e-02$	1.7	$3.756e+00$
40	$2.50e-02$	$2.998e-04$	2.0	$4.577e-01$	$5.443e-03$	1.9	$5.457e+00$
80	$1.25e-02$	$7.527e-05$	2.0	$4.684e-01$	$1.422e-03$	1.9	$6.885e+00$
160	$6.25e-03$	$1.885e-05$	2.0	$4.768e-01$	$3.635e-04$	2.0	$7.913e+00$
320	$3.13e-03$	$4.713e-06$	2.0	$4.820e-01$	$9.188e-05$	2.0	$8.580e+00$

Table 162: Numerical experiment `ewa3214` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.007e-01$			$2.007e-01$		
20	$5.00e-02$	$7.445e-02$	1.4	$5.417e+00$	$7.445e-02$	1.4	$5.417e+00$
40	$2.50e-02$	$3.011e-02$	1.3	$3.722e+00$	$3.011e-02$	1.3	$3.722e+00$
80	$1.25e-02$	$1.259e-02$	1.3	$3.128e+00$	$1.259e-02$	1.3	$3.128e+00$
160	$6.25e-03$	$5.352e-03$	1.2	$2.801e+00$	$5.352e-03$	1.2	$2.801e+00$
320	$3.13e-03$	$2.299e-03$	1.2	$2.606e+00$	$2.299e-03$	1.2	$2.606e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.202e-02$			$1.206e-02$		
20	$5.00e-02$	$3.025e-03$	2.0	$1.178e+00$	$3.096e-03$	2.0	$1.104e+00$
40	$2.50e-02$	$7.574e-04$	2.0	$1.201e+00$	$7.699e-04$	2.0	$1.267e+00$
80	$1.25e-02$	$1.899e-04$	2.0	$1.194e+00$	$1.912e-04$	2.0	$1.277e+00$
160	$6.25e-03$	$4.748e-05$	2.0	$1.214e+00$	$4.765e-05$	2.0	$1.248e+00$
320	$3.13e-03$	$1.187e-05$	2.0	$1.215e+00$	$1.189e-05$	2.0	$1.236e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.174e-01$			$1.174e-01$		
20	$5.00e-02$	$5.155e-02$	1.2	$1.805e+00$	$5.155e-02$	1.2	$1.805e+00$
40	$2.50e-02$	$2.264e-02$	1.2	$1.805e+00$	$2.264e-02$	1.2	$1.805e+00$
80	$1.25e-02$	$9.922e-03$	1.2	$1.827e+00$	$9.922e-03$	1.2	$1.827e+00$
160	$6.25e-03$	$4.337e-03$	1.2	$1.855e+00$	$4.337e-03$	1.2	$1.855e+00$
320	$3.13e-03$	$1.893e-03$	1.2	$1.879e+00$	$1.893e-03$	1.2	$1.879e+00$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.464e-04$			$3.485e-03$		
20	$5.00e-02$	$4.820e-05$	2.8	$2.427e-01$	$5.225e-04$	2.7	$1.905e+00$
40	$2.50e-02$	$6.848e-06$	2.8	$2.217e-01$	$7.176e-05$	2.9	$2.784e+00$
80	$1.25e-02$	$9.797e-07$	2.8	$2.137e-01$	$9.409e-06$	2.9	$3.559e+00$
160	$6.25e-03$	$1.405e-07$	2.8	$2.105e-01$	$1.205e-06$	3.0	$4.135e+00$
320	$3.13e-03$	$2.016e-08$	2.8	$2.093e-01$	$1.525e-07$	3.0	$4.516e+00$

Table 163: Numerical experiment `ewa3214` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.302e-03$			$9.302e-03$		
20	$5.00e-02$	$6.653e-04$	3.8	$5.944e+01$	$6.653e-04$	3.8	$5.944e+01$
40	$2.50e-02$	$4.300e-05$	4.0	$9.201e+01$	$4.300e-05$	4.0	$9.201e+01$
80	$1.25e-02$	$2.712e-06$	4.0	$1.049e+02$	$2.712e-06$	4.0	$1.049e+02$
160	$6.25e-03$	$1.699e-07$	4.0	$1.094e+02$	$1.699e-07$	4.0	$1.094e+02$
320	$3.13e-03$	$1.069e-08$	4.0	$1.058e+02$	$1.069e-08$	4.0	$1.058e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.133e-05$			$5.662e-04$		
20	$5.00e-02$	$1.229e-06$	4.1	$2.793e-01$	$4.432e-05$	3.7	$2.680e+00$
40	$2.50e-02$	$7.559e-08$	4.0	$2.111e-01$	$3.109e-06$	3.8	$4.306e+00$
80	$1.25e-02$	$4.707e-09$	4.0	$1.974e-01$	$2.060e-07$	3.9	$5.831e+00$
160	$6.25e-03$	$2.939e-10$	4.0	$1.939e-01$	$1.326e-08$	4.0	$7.006e+00$
320	$3.13e-03$	$1.836e-11$	4.0	$1.932e-01$	$8.411e-10$	4.0	$7.800e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.249e-03$			$5.249e-03$		
20	$5.00e-02$	$3.602e-04$	3.9	$3.849e+01$	$3.602e-04$	3.9	$3.849e+01$
40	$2.50e-02$	$2.293e-05$	4.0	$5.322e+01$	$2.293e-05$	4.0	$5.322e+01$
80	$1.25e-02$	$1.447e-06$	4.0	$5.585e+01$	$1.447e-06$	4.0	$5.585e+01$
160	$6.25e-03$	$9.060e-08$	4.0	$5.848e+01$	$9.060e-08$	4.0	$5.848e+01$
320	$3.13e-03$	$5.571e-09$	4.0	$6.687e+01$	$5.571e-09$	4.0	$6.687e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$3.313e-06$			$1.877e-04$		
20	$5.00e-02$	$1.764e-07$	4.2	$5.649e-02$	$1.521e-05$	3.6	$7.921e-01$
40	$2.50e-02$	$1.013e-08$	4.1	$4.055e-02$	$1.086e-06$	3.8	$1.370e+00$
80	$1.25e-02$	$6.186e-10$	4.0	$2.944e-02$	$7.260e-08$	3.9	$1.943e+00$
160	$6.25e-03$	$3.835e-11$	4.0	$2.668e-02$	$4.694e-09$	4.0	$2.400e+00$
320	$3.13e-03$	$2.389e-12$	4.0	$2.572e-02$	$2.984e-10$	4.0	$2.716e+00$

Table 164: Numerical experiment `ewa3214` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.409e-03$			$1.409e-03$		
20	$5.00e-02$	$9.096e-05$	4.0	$1.267e+01$	$9.096e-05$	4.0	$1.267e+01$
40	$2.50e-02$	$5.643e-06$	4.0	$1.503e+01$	$5.643e-06$	4.0	$1.503e+01$
80	$1.25e-02$	$3.465e-07$	4.0	$1.588e+01$	$3.465e-07$	4.0	$1.588e+01$
160	$6.25e-03$	$2.137e-08$	4.0	$1.544e+01$	$2.137e-08$	4.0	$1.544e+01$
320	$3.13e-03$	$1.012e-09$	4.4	$1.066e+02$	$1.012e-09$	4.4	$1.066e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.005e-05$			$8.398e-05$		
20	$5.00e-02$	$5.143e-06$	4.0	$7.300e-01$	$5.361e-06$	4.0	$7.827e-01$
40	$2.50e-02$	$3.250e-07$	4.0	$7.848e-01$	$3.313e-07$	4.0	$9.010e-01$
80	$1.25e-02$	$2.034e-08$	4.0	$8.259e-01$	$2.056e-08$	4.0	$8.791e-01$
160	$6.25e-03$	$1.273e-09$	4.0	$8.281e-01$	$1.279e-09$	4.0	$8.684e-01$
320	$3.13e-03$	$7.969e-11$	4.0	$8.228e-01$	$7.986e-11$	4.0	$8.445e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.172e-04$			$5.172e-04$		
20	$5.00e-02$	$3.337e-05$	4.0	$4.652e+00$	$3.337e-05$	4.0	$4.652e+00$
40	$2.50e-02$	$2.073e-06$	4.0	$5.486e+00$	$2.073e-06$	4.0	$5.486e+00$
80	$1.25e-02$	$1.274e-07$	4.0	$5.806e+00$	$1.274e-07$	4.0	$5.806e+00$
160	$6.25e-03$	$7.796e-09$	4.0	$5.952e+00$	$7.796e-09$	4.0	$5.952e+00$
320	$3.13e-03$	$4.234e-10$	4.2	$1.430e+01$	$4.234e-10$	4.2	$1.430e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.680e-08$			$9.491e-06$		
20	$5.00e-02$	$9.329e-10$	5.6	$2.083e-02$	$3.873e-07$	4.6	$3.912e-01$
40	$2.50e-02$	$1.899e-11$	5.6	$1.903e-02$	$1.388e-08$	4.8	$6.850e-01$
80	$1.25e-02$	$3.892e-13$	5.6	$1.837e-02$	$4.651e-10$	4.9	$9.815e-01$
160	$6.25e-03$	$8.461e-15$	5.5	$1.266e-02$	$1.506e-11$	4.9	$1.220e+00$
320	$3.13e-03$	$6.661e-15$	0.3	$4.874e-14$	$4.814e-13$	5.0	$1.335e+00$

Table 165: Numerical experiment `ewa3214` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.919e-05$			$7.919e-05$		
20	$5.00e-02$	$1.458e-06$	5.8	$4.592e+01$	$1.458e-06$	5.8	$4.592e+01$
40	$2.50e-02$	$2.378e-08$	5.9	$7.748e+01$	$2.378e-08$	5.9	$7.748e+01$
80	$1.25e-02$	$4.140e-10$	5.8	$5.483e+01$	$4.140e-10$	5.8	$5.483e+01$
160	$6.25e-03$	$3.992e-10$	0.1	$5.208e-10$	$3.992e-10$	0.1	$5.208e-10$
320	$3.13e-03$	$2.955e-10$	0.4	$3.614e-09$	$2.955e-10$	0.4	$3.614e-09$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.149e-07$			$3.222e-06$		
20	$5.00e-02$	$1.657e-09$	6.1	$1.500e-01$	$6.651e-08$	5.6	$1.278e+00$
40	$2.50e-02$	$2.529e-11$	6.0	$1.175e-01$	$1.199e-09$	5.8	$2.296e+00$
80	$1.25e-02$	$4.179e-13$	5.9	$7.689e-02$	$2.012e-11$	5.9	$3.351e+00$
160	$6.25e-03$	$1.634e-13$	1.4	$1.580e-10$	$4.263e-13$	5.6	$7.700e-01$
320	$3.13e-03$	$1.545e-13$	0.1	$2.460e-13$	$1.545e-13$	1.5	$7.185e-10$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa3214	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.102e-05$			$2.102e-05$		
20	$5.00e-02$	$3.683e-07$	5.8	$1.438e+01$	$3.683e-07$	5.8	$1.438e+01$
40	$2.50e-02$	$6.113e-09$	5.9	$1.815e+01$	$6.113e-09$	5.9	$1.815e+01$
80	$1.25e-02$	$9.379e-11$	6.0	$2.759e+01$	$9.379e-11$	6.0	$2.759e+01$
160	$6.25e-03$	$8.261e-11$	0.2	$2.091e-10$	$8.261e-11$	0.2	$2.091e-10$
320	$3.13e-03$	$7.250e-11$	0.2	$2.149e-10$	$7.250e-11$	0.2	$2.149e-10$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.824e-09$			$4.424e-07$		
20	$5.00e-02$	$1.530e-11$	6.9	$1.442e-02$	$9.409e-09$	5.6	$1.588e-01$
40	$2.50e-02$	$1.586e-13$	6.6	$5.764e-03$	$1.723e-10$	5.8	$3.032e-01$
80	$1.25e-02$	$1.288e-14$	3.6	$1.008e-07$	$2.920e-12$	5.9	$4.581e-01$
160	$6.25e-03$	$3.064e-14$	-1.3	$5.370e-17$	$4.796e-14$	5.9	$5.587e-01$
320	$3.13e-03$	$6.439e-14$	-1.1	$1.333e-16$	$6.439e-14$	-0.4	$5.547e-15$

Table 166: Numerical experiment `ewa3214` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$8.366e-01$			$8.366e-01$		
20	$5.00e-02$	$2.341e-01$	1.8	$5.750e+01$	$2.341e-01$	1.8	$5.750e+01$
40	$2.50e-02$	$6.018e-02$	2.0	$8.309e+01$	$6.018e-02$	2.0	$8.309e+01$
80	$1.25e-02$	$1.516e-02$	2.0	$9.257e+01$	$1.516e-02$	2.0	$9.257e+01$
160	$6.25e-03$	$3.796e-03$	2.0	$9.586e+01$	$3.796e-03$	2.0	$9.586e+01$
320	$3.13e-03$	$9.494e-04$	2.0	$9.685e+01$	$9.494e-04$	2.0	$9.685e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.899e-03$			$8.285e-02$		
20	$5.00e-02$	$2.052e-03$	1.9	$6.957e-01$	$2.513e-02$	1.7	$4.360e+00$
40	$2.50e-02$	$5.179e-04$	2.0	$7.868e-01$	$6.927e-03$	1.9	$6.589e+00$
80	$1.25e-02$	$1.306e-04$	2.0	$7.904e-01$	$1.819e-03$	1.9	$8.529e+00$
160	$6.25e-03$	$3.268e-05$	2.0	$8.327e-01$	$4.661e-04$	2.0	$9.959e+00$
320	$3.13e-03$	$8.171e-06$	2.0	$8.356e-01$	$1.180e-04$	2.0	$1.090e+01$

Table 167: Numerical experiment `ewa32145` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	2	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.561e-01$			$2.561e-01$		
20	$5.00e-02$	$9.071e-02$	1.5	$8.053e+00$	$9.071e-02$	1.5	$8.053e+00$
40	$2.50e-02$	$3.475e-02$	1.4	$5.736e+00$	$3.475e-02$	1.4	$5.736e+00$
80	$1.25e-02$	$1.378e-02$	1.3	$4.774e+00$	$1.378e-02$	1.3	$4.774e+00$
160	$6.25e-03$	$5.559e-03$	1.3	$4.280e+00$	$5.559e-03$	1.3	$4.280e+00$
320	$3.13e-03$	$2.266e-03$	1.3	$3.974e+00$	$2.266e-03$	1.3	$3.974e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.580e-02$			$1.627e-02$		
20	$5.00e-02$	$3.997e-03$	2.0	$1.521e+00$	$4.143e-03$	2.0	$1.532e+00$
40	$2.50e-02$	$1.013e-03$	2.0	$1.507e+00$	$1.025e-03$	2.0	$1.733e+00$
80	$1.25e-02$	$2.534e-04$	2.0	$1.615e+00$	$2.553e-04$	2.0	$1.675e+00$
160	$6.25e-03$	$6.336e-05$	2.0	$1.620e+00$	$6.362e-05$	2.0	$1.666e+00$
320	$3.13e-03$	$1.584e-05$	2.0	$1.621e+00$	$1.587e-05$	2.0	$1.651e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	2	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.430e-01$			$1.430e-01$		
20	$5.00e-02$	$5.999e-02$	1.3	$2.563e+00$	$5.999e-02$	1.3	$2.563e+00$
40	$2.50e-02$	$2.521e-02$	1.3	$2.542e+00$	$2.521e-02$	1.3	$2.542e+00$
80	$1.25e-02$	$1.055e-02$	1.3	$2.597e+00$	$1.055e-02$	1.3	$2.597e+00$
160	$6.25e-03$	$4.400e-03$	1.3	$2.663e+00$	$4.400e-03$	1.3	$2.663e+00$
320	$3.13e-03$	$1.829e-03$	1.3	$2.717e+00$	$1.829e-03$	1.3	$2.717e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.508e-04$			$4.919e-03$		
20	$5.00e-02$	$4.527e-05$	3.0	$3.156e-01$	$7.538e-04$	2.7	$2.500e+00$
40	$2.50e-02$	$5.968e-06$	2.9	$2.878e-01$	$1.048e-04$	2.8	$3.813e+00$
80	$1.25e-02$	$7.919e-07$	2.9	$2.779e-01$	$1.383e-05$	2.9	$5.026e+00$
160	$6.25e-03$	$1.053e-07$	2.9	$2.741e-01$	$1.776e-06$	3.0	$5.953e+00$
320	$3.13e-03$	$1.402e-08$	2.9	$2.727e-01$	$2.251e-07$	3.0	$6.578e+00$

Table 168: Numerical experiment `ewa32145` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.772e-02$			$1.772e-02$		
20	$5.00e-02$	$1.309e-03$	3.8	$1.018e+02$	$1.309e-03$	3.8	$1.018e+02$
40	$2.50e-02$	$8.555e-05$	3.9	$1.727e+02$	$8.555e-05$	3.9	$1.727e+02$
80	$1.25e-02$	$5.387e-06$	4.0	$2.105e+02$	$5.387e-06$	4.0	$2.105e+02$
160	$6.25e-03$	$3.355e-07$	4.0	$2.258e+02$	$3.355e-07$	4.0	$2.258e+02$
320	$3.13e-03$	$2.140e-08$	4.0	$1.896e+02$	$2.140e-08$	4.0	$1.896e+02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.226e-05$			$9.083e-04$		
20	$5.00e-02$	$2.964e-06$	3.8	$2.883e-01$	$7.323e-05$	3.6	$3.900e+00$
40	$2.50e-02$	$1.905e-07$	4.0	$4.197e-01$	$5.218e-06$	3.8	$6.647e+00$
80	$1.25e-02$	$1.211e-08$	4.0	$4.466e-01$	$3.486e-07$	3.9	$9.371e+00$
160	$6.25e-03$	$7.580e-10$	4.0	$4.908e-01$	$2.253e-08$	4.0	$1.155e+01$
320	$3.13e-03$	$4.739e-11$	4.0	$4.954e-01$	$1.432e-09$	4.0	$1.305e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.412e-03$			$9.412e-03$		
20	$5.00e-02$	$6.936e-04$	3.8	$5.446e+01$	$6.936e-04$	3.8	$5.446e+01$
40	$2.50e-02$	$4.537e-05$	3.9	$9.111e+01$	$4.537e-05$	3.9	$9.111e+01$
80	$1.25e-02$	$2.846e-06$	4.0	$1.139e+02$	$2.846e-06$	4.0	$1.139e+02$
160	$6.25e-03$	$1.766e-07$	4.0	$1.224e+02$	$1.766e-07$	4.0	$1.224e+02$
320	$3.13e-03$	$1.167e-08$	3.9	$7.695e+01$	$1.167e-08$	3.9	$7.695e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.225e-06$			$2.959e-04$		
20	$5.00e-02$	$2.130e-07$	4.3	$8.618e-02$	$2.491e-05$	3.6	$1.100e+00$
40	$2.50e-02$	$1.109e-08$	4.3	$7.504e-02$	$1.814e-06$	3.8	$2.056e+00$
80	$1.25e-02$	$6.196e-10$	4.2	$5.163e-02$	$1.226e-07$	3.9	$3.071e+00$
160	$6.25e-03$	$3.515e-11$	4.1	$4.684e-02$	$7.966e-09$	3.9	$3.919e+00$
320	$3.13e-03$	$2.014e-12$	4.1	$4.343e-02$	$5.078e-10$	4.0	$4.521e+00$

Table 169: Numerical experiment `ewa32145` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.712e-03$			$2.712e-03$		
20	$5.00e-02$	$1.528e-04$	4.1	$3.827e+01$	$1.528e-04$	4.1	$3.827e+01$
40	$2.50e-02$	$1.073e-05$	3.8	$1.476e+01$	$1.073e-05$	3.8	$1.476e+01$
80	$1.25e-02$	$1.494e-06$	2.8	$3.878e-01$	$1.494e-06$	2.8	$3.878e-01$
160	$6.25e-03$	$2.338e-07$	2.7	$1.846e-01$	$2.338e-07$	2.7	$1.846e-01$
320	$3.13e-03$	$3.877e-08$	2.6	$1.211e-01$	$3.877e-08$	2.6	$1.211e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.367e-04$			$1.480e-04$		
20	$5.00e-02$	$9.108e-06$	3.9	$1.104e+00$	$9.387e-06$	4.0	$1.409e+00$
40	$2.50e-02$	$5.735e-07$	4.0	$1.411e+00$	$5.845e-07$	4.0	$1.527e+00$
80	$1.25e-02$	$3.591e-08$	4.0	$1.453e+00$	$3.629e-08$	4.0	$1.549e+00$
160	$6.25e-03$	$2.246e-09$	4.0	$1.464e+00$	$2.258e-09$	4.0	$1.530e+00$
320	$3.13e-03$	$1.404e-10$	4.0	$1.468e+00$	$1.408e-10$	4.0	$1.502e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.444e-04$			$9.444e-04$		
20	$5.00e-02$	$4.621e-05$	4.4	$2.129e+01$	$4.621e-05$	4.4	$2.129e+01$
40	$2.50e-02$	$4.906e-06$	3.2	$7.489e-01$	$4.906e-06$	3.2	$7.489e-01$
80	$1.25e-02$	$7.981e-07$	2.6	$7.731e-02$	$7.981e-07$	2.6	$7.731e-02$
160	$6.25e-03$	$1.338e-07$	2.6	$6.397e-02$	$1.338e-07$	2.6	$6.397e-02$
320	$3.13e-03$	$2.287e-08$	2.5	$5.538e-02$	$2.287e-08$	2.5	$5.538e-02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.554e-07$			$1.728e-05$		
20	$5.00e-02$	$1.847e-08$	4.3	$6.566e-03$	$7.330e-07$	4.6	$6.258e-01$
40	$2.50e-02$	$1.016e-09$	4.2	$5.118e-03$	$2.683e-08$	4.8	$1.185e+00$
80	$1.25e-02$	$5.676e-11$	4.2	$4.739e-03$	$9.085e-10$	4.9	$1.791e+00$
160	$6.25e-03$	$3.170e-12$	4.2	$4.734e-03$	$2.957e-11$	4.9	$2.302e+00$
320	$3.13e-03$	$1.756e-13$	4.2	$5.023e-03$	$9.432e-13$	5.0	$2.667e+00$

Table 170: Numerical experiment ewa32145 with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.942e-04$			$1.942e-04$		
20	$5.00e-02$	$3.555e-06$	5.8	$1.147e+02$	$3.555e-06$	5.8	$1.147e+02$
40	$2.50e-02$	$6.946e-08$	5.7	$8.661e+01$	$6.946e-08$	5.7	$8.661e+01$
80	$1.25e-02$	$3.282e-09$	4.4	$7.873e-01$	$3.282e-09$	4.4	$7.873e-01$
160	$6.25e-03$	$5.214e-10$	2.7	$3.691e-04$	$5.214e-10$	2.7	$3.691e-04$
320	$3.13e-03$	$4.596e-10$	0.2	$1.315e-09$	$4.596e-10$	0.2	$1.315e-09$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.279e-07$			$6.797e-06$		
20	$5.00e-02$	$2.895e-09$	5.5	$3.730e-02$	$1.460e-07$	5.5	$2.362e+00$
40	$2.50e-02$	$5.522e-11$	5.7	$7.829e-02$	$2.687e-09$	5.8	$4.599e+00$
80	$1.25e-02$	$2.450e-12$	4.5	$8.750e-04$	$4.567e-11$	5.9	$7.038e+00$
160	$6.25e-03$	$1.652e-13$	3.9	$6.213e-05$	$6.715e-13$	6.1	$1.760e+01$
320	$3.13e-03$	$8.527e-14$	1.0	$2.095e-11$	$8.527e-14$	3.0	$2.451e-06$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa32145	...	3	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.030e-05$			$5.030e-05$		
20	$5.00e-02$	$8.266e-07$	5.9	$4.253e+01$	$8.266e-07$	5.9	$4.253e+01$
40	$2.50e-02$	$2.645e-08$	5.0	$2.387e+00$	$2.645e-08$	5.0	$2.387e+00$
80	$1.25e-02$	$1.574e-09$	4.1	$8.807e-02$	$1.574e-09$	4.1	$8.807e-02$
160	$6.25e-03$	$1.352e-10$	3.5	$8.642e-03$	$1.352e-10$	3.5	$8.642e-03$
320	$3.13e-03$	$5.351e-11$	1.3	$1.194e-07$	$5.351e-11$	1.3	$1.194e-07$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.032e-09$			$9.201e-07$		
20	$5.00e-02$	$3.407e-10$	4.4	$1.638e-04$	$2.050e-08$	5.5	$2.832e-01$
40	$2.50e-02$	$1.511e-11$	4.5	$2.405e-04$	$3.848e-10$	5.7	$5.933e-01$
80	$1.25e-02$	$6.693e-13$	4.5	$2.413e-04$	$6.603e-12$	5.9	$9.578e-01$
160	$6.25e-03$	$3.331e-14$	4.3	$1.158e-04$	$1.101e-13$	5.9	$1.145e+00$
320	$3.13e-03$	$5.373e-14$	-0.7	$1.004e-15$	$5.373e-14$	1.0	$2.108e-11$

Table 171: Numerical experiment `ewa32145` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.628e-02$			$1.628e-02$		
20	$5.00e-02$	$4.089e-03$	2.0	$1.602e+00$	$4.089e-03$	2.0	$1.602e+00$
40	$2.50e-02$	$1.023e-03$	2.0	$1.634e+00$	$1.023e-03$	2.0	$1.634e+00$
80	$1.25e-02$	$2.556e-04$	2.0	$1.636e+00$	$2.556e-04$	2.0	$1.636e+00$
160	$6.25e-03$	$6.391e-05$	2.0	$1.636e+00$	$6.391e-05$	2.0	$1.636e+00$
320	$3.13e-03$	$1.598e-05$	2.0	$1.636e+00$	$1.598e-05$	2.0	$1.636e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.769e-03$			$8.435e-03$		
20	$5.00e-02$	$1.190e-03$	2.0	$4.794e-01$	$2.109e-03$	2.0	$8.437e-01$
40	$2.50e-02$	$2.975e-04$	2.0	$4.770e-01$	$5.271e-04$	2.0	$8.442e-01$
80	$1.25e-02$	$7.437e-05$	2.0	$4.762e-01$	$1.318e-04$	2.0	$8.433e-01$
160	$6.25e-03$	$1.859e-05$	2.0	$4.760e-01$	$3.294e-05$	2.0	$8.434e-01$
320	$3.13e-03$	$4.648e-06$	2.0	$4.759e-01$	$8.236e-06$	2.0	$8.434e-01$

Table 172: Numerical experiment `lin41` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.425e-03$			$5.425e-03$		
20	$5.00e-02$	$1.360e-03$	2.0	$5.380e-01$	$1.360e-03$	2.0	$5.380e-01$
40	$2.50e-02$	$3.401e-04$	2.0	$5.423e-01$	$3.401e-04$	2.0	$5.423e-01$
80	$1.25e-02$	$8.504e-05$	2.0	$5.437e-01$	$8.504e-05$	2.0	$5.437e-01$
160	$6.25e-03$	$2.126e-05$	2.0	$5.441e-01$	$2.126e-05$	2.0	$5.441e-01$
320	$3.13e-03$	$5.315e-06$	2.0	$5.442e-01$	$5.315e-06$	2.0	$5.442e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.166e-03$			$1.166e-03$		
20	$5.00e-02$	$2.912e-04$	2.0	$1.171e-01$	$2.912e-04$	2.0	$1.171e-01$
40	$2.50e-02$	$7.277e-05$	2.0	$1.166e-01$	$7.277e-05$	2.0	$1.166e-01$
80	$1.25e-02$	$1.819e-05$	2.0	$1.165e-01$	$1.819e-05$	2.0	$1.165e-01$
160	$6.25e-03$	$4.548e-06$	2.0	$1.164e-01$	$4.548e-06$	2.0	$1.164e-01$
320	$3.13e-03$	$1.137e-06$	2.0	$1.164e-01$	$1.137e-06$	2.0	$1.164e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.810e-03$			$4.810e-03$		
20	$5.00e-02$	$1.206e-03$	2.0	$4.764e-01$	$1.206e-03$	2.0	$4.764e-01$
40	$2.50e-02$	$3.015e-04$	2.0	$4.827e-01$	$3.015e-04$	2.0	$4.827e-01$
80	$1.25e-02$	$7.539e-05$	2.0	$4.816e-01$	$7.539e-05$	2.0	$4.816e-01$
160	$6.25e-03$	$1.885e-05$	2.0	$4.825e-01$	$1.885e-05$	2.0	$4.825e-01$
320	$3.13e-03$	$4.712e-06$	2.0	$4.825e-01$	$4.712e-06$	2.0	$4.825e-01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.902e-05$			$4.115e-05$		
20	$5.00e-02$	$2.349e-06$	3.0	$1.981e-02$	$5.068e-06$	3.0	$4.324e-02$
40	$2.50e-02$	$2.916e-07$	3.0	$1.938e-02$	$6.285e-07$	3.0	$4.194e-02$
80	$1.25e-02$	$3.631e-08$	3.0	$1.904e-02$	$7.825e-08$	3.0	$4.110e-02$
160	$6.25e-03$	$4.530e-09$	3.0	$1.882e-02$	$9.762e-09$	3.0	$4.058e-02$
320	$3.13e-03$	$5.658e-10$	3.0	$1.868e-02$	$1.219e-09$	3.0	$4.032e-02$

Table 173: Numerical experiment `lin41` with $m = 2$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.363e-05$			$1.363e-05$		
20	$5.00e-02$	$8.506e-07$	4.0	$1.368e-01$	$8.506e-07$	4.0	$1.368e-01$
40	$2.50e-02$	$5.315e-08$	4.0	$1.363e-01$	$5.315e-08$	4.0	$1.363e-01$
80	$1.25e-02$	$3.322e-09$	4.0	$1.361e-01$	$3.322e-09$	4.0	$1.361e-01$
160	$6.25e-03$	$2.078e-10$	4.0	$1.353e-01$	$2.078e-10$	4.0	$1.353e-01$
320	$3.13e-03$	$1.348e-11$	3.9	$1.038e-01$	$1.348e-11$	3.9	$1.038e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.474e-06$			$2.670e-06$		
20	$5.00e-02$	$9.240e-08$	4.0	$1.459e-02$	$1.715e-07$	4.0	$2.437e-02$
40	$2.50e-02$	$5.779e-09$	4.0	$1.473e-02$	$1.087e-08$	4.0	$2.587e-02$
80	$1.25e-02$	$3.613e-10$	4.0	$1.478e-02$	$6.839e-10$	4.0	$2.684e-02$
160	$6.25e-03$	$2.253e-11$	4.0	$1.501e-02$	$4.283e-11$	4.0	$2.763e-02$
320	$3.13e-03$	$1.330e-12$	4.1	$2.241e-02$	$2.602e-12$	4.0	$3.455e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.120e-05$			$1.120e-05$		
20	$5.00e-02$	$7.000e-07$	4.0	$1.118e-01$	$7.000e-07$	4.0	$1.118e-01$
40	$2.50e-02$	$4.376e-08$	4.0	$1.120e-01$	$4.376e-08$	4.0	$1.120e-01$
80	$1.25e-02$	$2.734e-09$	4.0	$1.121e-01$	$2.734e-09$	4.0	$1.121e-01$
160	$6.25e-03$	$1.698e-10$	4.0	$1.165e-01$	$1.698e-10$	4.0	$1.165e-01$
320	$3.13e-03$	$8.105e-12$	4.4	$8.017e-01$	$8.105e-12$	4.4	$8.017e-01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.942e-09$			$4.387e-07$		
20	$5.00e-02$	$5.637e-11$	5.1	$2.481e-04$	$2.858e-08$	3.9	$3.823e-03$
40	$2.50e-02$	$1.742e-12$	5.0	$1.892e-04$	$1.824e-09$	4.0	$4.183e-03$
80	$1.25e-02$	$2.187e-13$	3.0	$1.090e-07$	$1.150e-10$	4.0	$4.446e-03$
160	$6.25e-03$	$3.952e-13$	-0.9	$5.191e-15$	$6.992e-12$	4.0	$5.616e-03$
320	$3.13e-03$	$8.477e-13$	-1.1	$1.481e-15$	$1.007e-12$	2.8	$1.013e-05$

Table 174: Numerical experiment `lin41` with $m = 3$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.521e-06$			$2.521e-06$		
20	$5.00e-02$	$1.578e-07$	4.0	$2.510e-02$	$1.578e-07$	4.0	$2.510e-02$
40	$2.50e-02$	$9.867e-09$	4.0	$2.520e-02$	$9.867e-09$	4.0	$2.520e-02$
80	$1.25e-02$	$6.172e-10$	4.0	$2.515e-02$	$6.172e-10$	4.0	$2.515e-02$
160	$6.25e-03$	$3.821e-11$	4.0	$2.687e-02$	$3.821e-11$	4.0	$2.687e-02$
320	$3.13e-03$	$2.199e-12$	4.1	$4.584e-02$	$2.199e-12$	4.1	$4.584e-02$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.085e-07$			$6.085e-07$		
20	$5.00e-02$	$3.804e-08$	4.0	$6.083e-03$	$3.804e-08$	4.0	$6.083e-03$
40	$2.50e-02$	$2.377e-09$	4.0	$6.086e-03$	$2.377e-09$	4.0	$6.086e-03$
80	$1.25e-02$	$1.485e-10$	4.0	$6.092e-03$	$1.485e-10$	4.0	$6.092e-03$
160	$6.25e-03$	$9.284e-12$	4.0	$6.083e-03$	$9.284e-12$	4.0	$6.083e-03$
320	$3.13e-03$	$3.511e-13$	4.7	$2.412e-01$	$3.511e-13$	4.7	$2.412e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.280e-06$			$1.280e-06$		
20	$5.00e-02$	$8.001e-08$	4.0	$1.280e-02$	$8.001e-08$	4.0	$1.280e-02$
40	$2.50e-02$	$5.001e-09$	4.0	$1.280e-02$	$5.001e-09$	4.0	$1.280e-02$
80	$1.25e-02$	$3.125e-10$	4.0	$1.281e-02$	$3.125e-10$	4.0	$1.281e-02$
160	$6.25e-03$	$1.936e-11$	4.0	$1.356e-02$	$1.936e-11$	4.0	$1.356e-02$
320	$3.13e-03$	$6.568e-13$	4.9	$1.110e+00$	$6.568e-13$	4.9	$1.110e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.073e-14$			$3.616e-09$		
20	$5.00e-02$	$3.308e-14$	0.9	$4.567e-13$	$1.140e-10$	5.0	$3.505e-04$
40	$2.50e-02$	$4.419e-14$	-0.4	$9.473e-15$	$3.589e-12$	5.0	$3.543e-04$
80	$1.25e-02$	$3.997e-14$	0.1	$7.537e-14$	$1.273e-13$	4.8	$1.868e-04$
160	$6.25e-03$	$4.607e-14$	-0.2	$1.627e-14$	$4.796e-14$	1.4	$6.109e-11$
320	$3.13e-03$	$8.327e-14$	-0.9	$6.048e-16$	$8.371e-14$	-0.8	$8.125e-16$

Table 175: Numerical experiment `lin41` with $m = 4$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.750e-09$			$1.750e-09$		
20	$5.00e-02$	$2.736e-11$	6.0	$1.749e-03$	$2.736e-11$	6.0	$1.749e-03$
40	$2.50e-02$	$7.513e-13$	5.2	$1.530e-04$	$7.513e-13$	5.2	$1.530e-04$
80	$1.25e-02$	$1.373e-12$	-0.9	$3.036e-14$	$1.373e-12$	-0.9	$3.036e-14$
160	$6.25e-03$	$5.649e-13$	1.3	$3.766e-10$	$5.649e-13$	1.3	$3.766e-10$
320	$3.13e-03$	$1.100e-12$	-1.0	$4.292e-15$	$1.100e-12$	-1.0	$4.292e-15$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.887e-10$			$2.754e-10$		
20	$5.00e-02$	$2.943e-12$	6.0	$1.899e-04$	$4.287e-12$	6.0	$2.786e-04$
40	$2.50e-02$	$1.038e-13$	4.8	$5.578e-06$	$1.218e-13$	5.1	$2.072e-05$
80	$1.25e-02$	$4.219e-14$	1.3	$1.251e-11$	$4.219e-14$	1.5	$3.435e-11$
160	$6.25e-03$	$3.841e-14$	0.1	$7.630e-14$	$4.752e-14$	-0.2	$1.989e-14$
320	$3.13e-03$	$3.113e-13$	-3.0	$8.532e-21$	$3.113e-13$	-2.7	$5.009e-20$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin41	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.898e-10$			$6.898e-10$		
20	$5.00e-02$	$1.074e-11$	6.0	$6.969e-04$	$1.074e-11$	6.0	$6.969e-04$
40	$2.50e-02$	$1.510e-13$	6.2	$1.087e-03$	$1.510e-13$	6.2	$1.087e-03$
80	$1.25e-02$	$2.638e-13$	-0.8	$7.756e-15$	$2.638e-13$	-0.8	$7.756e-15$
160	$6.25e-03$	$4.676e-13$	-0.8	$7.069e-15$	$4.676e-13$	-0.8	$7.069e-15$
320	$3.13e-03$	$1.148e-12$	-1.3	$6.500e-16$	$1.148e-12$	-1.3	$6.500e-16$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.266e-14$			$1.634e-11$		
20	$5.00e-02$	$2.709e-14$	-1.1	$1.010e-15$	$2.762e-13$	5.9	$1.257e-05$
40	$2.50e-02$	$8.304e-14$	-1.6	$2.139e-16$	$8.304e-14$	1.7	$4.978e-11$
80	$1.25e-02$	$7.772e-14$	0.1	$1.182e-13$	$7.772e-14$	0.1	$1.182e-13$
160	$6.25e-03$	$1.639e-13$	-1.1	$6.955e-16$	$1.640e-13$	-1.1	$6.925e-16$
320	$3.13e-03$	$3.044e-13$	-0.9	$1.758e-15$	$3.044e-13$	-0.9	$1.768e-15$

Table 176: Numerical experiment `lin41` with $m = 5$ equidistant (top), and Gaussian collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.315e+01$			$2.315e+01$		
20	$5.00e-02$	$5.902e+00$	2.0	$2.168e+03$	$5.902e+00$	2.0	$2.168e+03$
40	$2.50e-02$	$1.483e+00$	2.0	$2.311e+03$	$1.483e+00$	2.0	$2.311e+03$
80	$1.25e-02$	$3.712e-01$	2.0	$2.357e+03$	$3.712e-01$	2.0	$2.357e+03$
160	$6.25e-03$	$9.283e-02$	2.0	$2.371e+03$	$9.283e-02$	2.0	$2.371e+03$
320	$3.13e-03$	$2.321e-02$	2.0	$2.375e+03$	$2.321e-02$	2.0	$2.375e+03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.724e+00$			$4.724e+00$		
20	$5.00e-02$	$1.187e+00$	2.0	$4.637e+02$	$1.187e+00$	2.0	$4.637e+02$
40	$2.50e-02$	$2.973e-01$	2.0	$4.721e+02$	$2.973e-01$	2.0	$4.721e+02$
80	$1.25e-02$	$7.435e-02$	2.0	$4.748e+02$	$7.435e-02$	2.0	$4.748e+02$
160	$6.25e-03$	$1.859e-02$	2.0	$4.756e+02$	$1.859e-02$	2.0	$4.756e+02$
320	$3.13e-03$	$4.647e-03$	2.0	$4.758e+02$	$4.647e-03$	2.0	$4.758e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	1	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.157e+02$			$1.157e+02$		
20	$5.00e-02$	$5.551e+01$	1.1	$1.329e+03$	$5.551e+01$	1.1	$1.329e+03$
40	$2.50e-02$	$2.716e+01$	1.0	$1.219e+03$	$2.716e+01$	1.0	$1.219e+03$
80	$1.25e-02$	$1.343e+01$	1.0	$1.152e+03$	$1.343e+01$	1.0	$1.152e+03$
160	$6.25e-03$	$6.679e+00$	1.0	$1.113e+03$	$6.679e+00$	1.0	$1.113e+03$
320	$3.13e-03$	$3.330e+00$	1.0	$1.091e+03$	$3.330e+00$	1.0	$1.091e+03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.157e+02$			$1.157e+02$		
20	$5.00e-02$	$5.551e+01$	1.1	$1.329e+03$	$5.551e+01$	1.1	$1.329e+03$
40	$2.50e-02$	$2.716e+01$	1.0	$1.219e+03$	$2.716e+01$	1.0	$1.219e+03$
80	$1.25e-02$	$1.343e+01$	1.0	$1.152e+03$	$1.343e+01$	1.0	$1.152e+03$
160	$6.25e-03$	$6.679e+00$	1.0	$1.113e+03$	$6.679e+00$	1.0	$1.113e+03$
320	$3.13e-03$	$3.330e+00$	1.0	$1.091e+03$	$3.330e+00$	1.0	$1.091e+03$

Table 177: Numerical experiment `lin42` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.992e+00$			$6.992e+00$		
20	$5.00e-02$	$1.757e+00$	2.0	$6.870e+02$	$1.757e+00$	2.0	$6.870e+02$
40	$2.50e-02$	$4.399e-01$	2.0	$6.989e+02$	$4.399e-01$	2.0	$6.989e+02$
80	$1.25e-02$	$1.100e-01$	2.0	$7.026e+02$	$1.100e-01$	2.0	$7.026e+02$
160	$6.25e-03$	$2.751e-02$	2.0	$7.037e+02$	$2.751e-02$	2.0	$7.037e+02$
320	$3.13e-03$	$6.877e-03$	2.0	$7.041e+02$	$6.877e-03$	2.0	$7.041e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.153e+00$			$3.153e+00$		
20	$5.00e-02$	$7.919e-01$	2.0	$3.105e+02$	$7.919e-01$	2.0	$3.105e+02$
40	$2.50e-02$	$1.982e-01$	2.0	$3.152e+02$	$1.982e-01$	2.0	$3.152e+02$
80	$1.25e-02$	$4.957e-02$	2.0	$3.166e+02$	$4.957e-02$	2.0	$3.166e+02$
160	$6.25e-03$	$1.239e-02$	2.0	$3.171e+02$	$1.239e-02$	2.0	$3.171e+02$
320	$3.13e-03$	$3.098e-03$	2.0	$3.172e+02$	$3.098e-03$	2.0	$3.172e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.248e+00$			$5.248e+00$		
20	$5.00e-02$	$1.318e+00$	2.0	$5.166e+02$	$1.318e+00$	2.0	$5.166e+02$
40	$2.50e-02$	$3.300e-01$	2.0	$5.246e+02$	$3.300e-01$	2.0	$5.246e+02$
80	$1.25e-02$	$8.251e-02$	2.0	$5.271e+02$	$8.251e-02$	2.0	$5.271e+02$
160	$6.25e-03$	$2.063e-02$	2.0	$5.278e+02$	$2.063e-02$	2.0	$5.278e+02$
320	$3.13e-03$	$5.158e-03$	2.0	$5.281e+02$	$5.158e-03$	2.0	$5.281e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.838e-02$			$1.605e-01$		
20	$5.00e-02$	$1.136e-03$	4.0	$1.907e+02$	$2.015e-02$	3.0	$1.582e+02$
40	$2.50e-02$	$7.079e-05$	4.0	$1.840e+02$	$2.504e-03$	3.0	$1.654e+02$
80	$1.25e-02$	$7.369e-06$	3.3	$1.200e+01$	$3.113e-04$	3.0	$1.649e+02$
160	$6.25e-03$	$8.653e-07$	3.1	$5.604e+00$	$3.878e-05$	3.0	$1.628e+02$
320	$3.13e-03$	$1.047e-07$	3.0	$4.499e+00$	$4.838e-06$	3.0	$1.610e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.047e-01$			$1.381e+00$		
20	$5.00e-02$	$5.707e-02$	3.1	$7.044e+02$	$2.035e-01$	2.8	$8.010e+02$
40	$2.50e-02$	$6.811e-03$	3.1	$5.577e+02$	$2.763e-02$	2.9	$1.138e+03$
80	$1.25e-02$	$8.327e-04$	3.0	$4.904e+02$	$3.601e-03$	2.9	$1.417e+03$
160	$6.25e-03$	$1.030e-04$	3.0	$4.558e+02$	$4.596e-04$	3.0	$1.616e+03$
320	$3.13e-03$	$1.281e-05$	3.0	$4.385e+02$	$5.805e-05$	3.0	$1.744e+03$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.732e-01$			$3.059e-01$		
20	$5.00e-02$	$3.404e-02$	3.0	$2.761e+02$	$3.853e-02$	3.0	$2.982e+02$
40	$2.50e-02$	$4.243e-03$	3.0	$2.757e+02$	$4.807e-03$	3.0	$3.108e+02$
80	$1.25e-02$	$5.294e-04$	3.0	$2.741e+02$	$6.002e-04$	3.0	$3.097e+02$
160	$6.25e-03$	$6.611e-05$	3.0	$2.727e+02$	$7.493e-05$	3.0	$3.096e+02$
320	$3.13e-03$	$8.260e-06$	3.0	$2.718e+02$	$9.359e-06$	3.0	$3.086e+02$

Table 178: Numerical experiment `lin42` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.226e-02$			$9.226e-02$		
20	$5.00e-02$	$5.875e-03$	4.0	$8.668e+02$	$5.875e-03$	4.0	$8.668e+02$
40	$2.50e-02$	$3.690e-04$	4.0	$9.211e+02$	$3.690e-04$	4.0	$9.211e+02$
80	$1.25e-02$	$2.309e-05$	4.0	$9.386e+02$	$2.309e-05$	4.0	$9.386e+02$
160	$6.25e-03$	$1.443e-06$	4.0	$9.439e+02$	$1.443e-06$	4.0	$9.439e+02$
320	$3.13e-03$	$9.043e-08$	4.0	$9.290e+02$	$9.043e-08$	4.0	$9.290e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.778e-03$			$1.204e-02$		
20	$5.00e-02$	$5.516e-04$	4.0	$8.622e+01$	$7.457e-04$	4.0	$1.241e+02$
40	$2.50e-02$	$3.452e-05$	4.0	$8.774e+01$	$4.651e-05$	4.0	$1.203e+02$
80	$1.25e-02$	$2.158e-06$	4.0	$8.822e+01$	$2.900e-06$	4.0	$1.206e+02$
160	$6.25e-03$	$1.349e-07$	4.0	$8.834e+01$	$1.809e-07$	4.0	$1.204e+02$
320	$3.13e-03$	$8.439e-09$	4.0	$8.792e+01$	$1.129e-08$	4.0	$1.197e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.924e-02$			$4.924e-02$		
20	$5.00e-02$	$3.134e-03$	4.0	$4.633e+02$	$3.134e-03$	4.0	$4.633e+02$
40	$2.50e-02$	$1.968e-04$	4.0	$4.916e+02$	$1.968e-04$	4.0	$4.916e+02$
80	$1.25e-02$	$1.231e-05$	4.0	$5.007e+02$	$1.231e-05$	4.0	$5.007e+02$
160	$6.25e-03$	$7.698e-07$	4.0	$5.034e+02$	$7.698e-07$	4.0	$5.034e+02$
320	$3.13e-03$	$4.861e-08$	4.0	$4.678e+02$	$4.861e-08$	4.0	$4.678e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.940e-04$			$4.097e-03$		
20	$5.00e-02$	$2.370e-05$	4.1	$4.477e+00$	$2.847e-04$	3.8	$2.883e+01$
40	$2.50e-02$	$1.451e-06$	4.0	$4.142e+00$	$1.882e-05$	3.9	$3.575e+01$
80	$1.25e-02$	$8.973e-08$	4.0	$3.930e+00$	$1.211e-06$	4.0	$4.131e+01$
160	$6.25e-03$	$5.578e-09$	4.0	$3.803e+00$	$7.676e-08$	4.0	$4.526e+01$
320	$3.13e-03$	$3.477e-10$	4.0	$3.729e+00$	$4.795e-09$	4.0	$5.047e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.790e-03$			$3.781e-02$		
20	$5.00e-02$	$1.026e-04$	4.1	$2.383e+01$	$2.573e-03$	3.9	$2.848e+02$
40	$2.50e-02$	$6.278e-06$	4.0	$1.801e+01$	$1.672e-04$	3.9	$3.484e+02$
80	$1.25e-02$	$3.881e-07$	4.0	$1.705e+01$	$1.064e-05$	4.0	$3.884e+02$
160	$6.25e-03$	$2.412e-08$	4.0	$1.647e+01$	$6.709e-07$	4.0	$4.122e+02$
320	$3.13e-03$	$1.503e-09$	4.0	$1.614e+01$	$4.212e-08$	4.0	$4.259e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.712e-04$			$8.313e-03$		
20	$5.00e-02$	$5.131e-05$	4.2	$1.697e+01$	$5.454e-04$	3.9	$7.074e+01$
40	$2.50e-02$	$3.139e-06$	4.0	$9.004e+00$	$3.837e-05$	3.8	$5.233e+01$
80	$1.25e-02$	$1.940e-07$	4.0	$8.525e+00$	$2.546e-06$	3.9	$7.141e+01$
160	$6.25e-03$	$1.206e-08$	4.0	$8.236e+00$	$1.640e-07$	4.0	$8.623e+01$
320	$3.13e-03$	$7.515e-10$	4.0	$8.070e+00$	$1.039e-08$	4.0	$9.725e+01$

Table 179: Numerical experiment `lin42` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.539e-02$			$1.539e-02$		
20	$5.00e-02$	$9.669e-04$	4.0	$1.511e+02$	$9.669e-04$	4.0	$1.511e+02$
40	$2.50e-02$	$6.052e-05$	4.0	$1.538e+02$	$6.052e-05$	4.0	$1.538e+02$
80	$1.25e-02$	$3.784e-06$	4.0	$1.546e+02$	$3.784e-06$	4.0	$1.546e+02$
160	$6.25e-03$	$2.365e-07$	4.0	$1.549e+02$	$2.365e-07$	4.0	$1.549e+02$
320	$3.13e-03$	$1.495e-08$	4.0	$1.426e+02$	$1.495e-08$	4.0	$1.426e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.102e-03$			$6.102e-03$		
20	$5.00e-02$	$3.833e-04$	4.0	$5.998e+01$	$3.833e-04$	4.0	$5.998e+01$
40	$2.50e-02$	$2.399e-05$	4.0	$6.099e+01$	$2.399e-05$	4.0	$6.099e+01$
80	$1.25e-02$	$1.500e-06$	4.0	$6.131e+01$	$1.500e-06$	4.0	$6.131e+01$
160	$6.25e-03$	$9.375e-08$	4.0	$6.137e+01$	$9.375e-08$	4.0	$6.137e+01$
320	$3.13e-03$	$5.878e-09$	4.0	$6.002e+01$	$5.878e-09$	4.0	$6.002e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.727e-03$			$5.727e-03$		
20	$5.00e-02$	$3.598e-04$	4.0	$5.632e+01$	$3.598e-04$	4.0	$5.632e+01$
40	$2.50e-02$	$2.251e-05$	4.0	$5.725e+01$	$2.251e-05$	4.0	$5.725e+01$
80	$1.25e-02$	$1.408e-06$	4.0	$5.754e+01$	$1.408e-06$	4.0	$5.754e+01$
160	$6.25e-03$	$8.799e-08$	4.0	$5.759e+01$	$8.799e-08$	4.0	$5.759e+01$
320	$3.13e-03$	$5.531e-09$	4.0	$5.529e+01$	$5.531e-09$	4.0	$5.529e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.457e-06$			$9.897e-05$		
20	$5.00e-02$	$1.109e-07$	5.0	$3.174e-01$	$3.325e-06$	4.9	$7.781e+00$
40	$2.50e-02$	$3.543e-09$	5.0	$3.221e-01$	$1.078e-07$	4.9	$9.061e+00$
80	$1.25e-02$	$1.122e-10$	5.0	$3.384e-01$	$3.434e-09$	5.0	$9.994e+00$
160	$6.25e-03$	$3.499e-12$	5.0	$3.717e-01$	$1.092e-10$	5.0	$1.010e+01$
320	$3.13e-03$	$3.809e-12$	-0.1	$1.880e-12$	$7.191e-12$	3.9	$4.866e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.556e-05$			$7.453e-04$		
20	$5.00e-02$	$4.974e-07$	5.0	$1.444e+00$	$2.564e-05$	4.9	$5.412e+01$
40	$2.50e-02$	$1.592e-08$	5.0	$1.434e+00$	$8.441e-07$	4.9	$6.556e+01$
80	$1.25e-02$	$5.049e-10$	5.0	$1.510e+00$	$2.706e-08$	5.0	$7.541e+01$
160	$6.25e-03$	$5.930e-11$	3.1	$3.833e-04$	$8.591e-10$	5.0	$8.033e+01$
320	$3.13e-03$	$1.216e-10$	-1.0	$3.087e-13$	$1.271e-10$	2.8	$1.023e-03$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.782e-06$			$1.845e-04$		
20	$5.00e-02$	$2.487e-07$	5.0	$7.220e-01$	$6.343e-06$	4.9	$1.343e+01$
40	$2.50e-02$	$7.962e-09$	5.0	$7.172e-01$	$2.086e-07$	4.9	$1.628e+01$
80	$1.25e-02$	$2.525e-10$	5.0	$7.548e-01$	$6.663e-09$	5.0	$1.899e+01$
160	$6.25e-03$	$5.930e-11$	2.1	$2.395e-06$	$2.579e-10$	4.7	$5.642e+00$
320	$3.13e-03$	$1.216e-10$	-1.0	$3.087e-13$	$1.271e-10$	1.0	$4.587e-08$

Table 180: Numerical experiment `lin42` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.119e-04$			$1.119e-04$		
20	$5.00e-02$	$1.774e-06$	6.0	$1.066e+02$	$1.774e-06$	6.0	$1.066e+02$
40	$2.50e-02$	$2.783e-08$	6.0	$1.117e+02$	$2.783e-08$	6.0	$1.117e+02$
80	$1.25e-02$	$4.324e-10$	6.0	$1.175e+02$	$4.324e-10$	6.0	$1.175e+02$
160	$6.25e-03$	$2.991e-11$	3.9	$9.317e-03$	$2.991e-11$	3.9	$9.317e-03$
320	$3.13e-03$	$2.206e-11$	0.4	$2.786e-10$	$2.206e-11$	0.4	$2.786e-10$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$9.693e-06$			$1.556e-05$		
20	$5.00e-02$	$1.514e-07$	6.0	$9.713e+00$	$2.404e-07$	6.0	$1.617e+01$
40	$2.50e-02$	$2.360e-09$	6.0	$9.779e+00$	$3.717e-09$	6.0	$1.610e+01$
80	$1.25e-02$	$3.635e-11$	6.0	$1.043e+01$	$5.692e-11$	6.0	$1.694e+01$
160	$6.25e-03$	$2.572e-12$	3.8	$6.793e-04$	$2.572e-12$	4.5	$1.812e-02$
320	$3.13e-03$	$9.635e-12$	-1.9	$1.625e-16$	$9.635e-12$	-1.9	$1.625e-16$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.879e-05$			$2.879e-05$		
20	$5.00e-02$	$4.563e-07$	6.0	$2.744e+01$	$4.563e-07$	6.0	$2.744e+01$
40	$2.50e-02$	$7.156e-09$	6.0	$2.876e+01$	$7.156e-09$	6.0	$2.876e+01$
80	$1.25e-02$	$1.107e-10$	6.0	$3.086e+01$	$1.107e-10$	6.0	$3.086e+01$
160	$6.25e-03$	$6.708e-12$	4.0	$5.527e-03$	$6.708e-12$	4.0	$5.527e-03$
320	$3.13e-03$	$1.603e-11$	-1.3	$1.138e-14$	$1.603e-11$	-1.3	$1.138e-14$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.028e-08$			$1.788e-06$		
20	$5.00e-02$	$4.157e-10$	4.6	$4.367e-04$	$3.097e-08$	5.9	$1.268e+00$
40	$2.50e-02$	$8.165e-12$	5.7	$9.897e-03$	$5.118e-10$	5.9	$1.556e+00$
80	$1.25e-02$	$4.221e-12$	1.0	$2.737e-10$	$1.215e-11$	5.4	$2.262e-01$
160	$6.25e-03$	$6.708e-12$	-0.7	$2.257e-13$	$6.708e-12$	0.9	$5.198e-10$
320	$3.13e-03$	$1.603e-11$	-1.3	$1.138e-14$	$1.603e-11$	-1.3	$1.138e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin42	...	6	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.891e-08$			$1.399e-05$		
20	$5.00e-02$	$1.743e-09$	4.1	$3.260e-04$	$2.397e-07$	5.9	$1.029e+01$
40	$2.50e-02$	$1.265e-10$	3.8	$1.462e-04$	$3.898e-09$	5.9	$1.292e+01$
80	$1.25e-02$	$2.645e-10$	-1.1	$2.493e-12$	$2.725e-10$	3.8	$5.494e-03$
160	$6.25e-03$	$5.426e-10$	-1.0	$2.815e-12$	$5.426e-10$	-1.0	$3.507e-12$
320	$3.13e-03$	$1.099e-09$	-1.0	$3.093e-12$	$1.099e-09$	-1.0	$3.093e-12$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.445e-08$			$3.234e-06$		
20	$5.00e-02$	$8.713e-10$	4.1	$1.630e-04$	$5.770e-08$	5.8	$2.081e+00$
40	$2.50e-02$	$1.265e-10$	2.8	$3.654e-06$	$1.082e-09$	5.7	$1.680e+00$
80	$1.25e-02$	$2.645e-10$	-1.1	$2.493e-12$	$2.725e-10$	2.0	$1.662e-06$
160	$6.25e-03$	$5.426e-10$	-1.0	$2.815e-12$	$5.426e-10$	-1.0	$3.507e-12$
320	$3.13e-03$	$1.099e-09$	-1.0	$3.093e-12$	$1.099e-09$	-1.0	$3.093e-12$

Table 181: Numerical experiment `lin42` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.817e+00$			$5.817e+00$		
20	$5.00e-02$	$1.475e+00$	2.0	$5.544e+02$	$1.475e+00$	2.0	$5.544e+02$
40	$2.50e-02$	$3.702e-01$	2.0	$5.810e+02$	$3.702e-01$	2.0	$5.810e+02$
80	$1.25e-02$	$9.264e-02$	2.0	$5.895e+02$	$9.264e-02$	2.0	$5.895e+02$
160	$6.25e-03$	$2.316e-02$	2.0	$5.920e+02$	$2.316e-02$	2.0	$5.920e+02$
320	$3.13e-03$	$5.791e-03$	2.0	$5.928e+02$	$5.791e-03$	2.0	$5.928e+02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.941e-01$			$1.603e+00$		
20	$5.00e-02$	$1.991e-01$	2.0	$7.859e+01$	$4.422e-01$	1.9	$1.157e+02$
40	$2.50e-02$	$4.982e-02$	2.0	$7.939e+01$	$1.162e-01$	1.9	$1.428e+02$
80	$1.25e-02$	$1.246e-02$	2.0	$7.963e+01$	$2.978e-02$	2.0	$1.628e+02$
160	$6.25e-03$	$3.115e-03$	2.0	$7.971e+01$	$7.537e-03$	2.0	$1.761e+02$
320	$3.13e-03$	$7.787e-04$	2.0	$7.973e+01$	$1.896e-03$	2.0	$1.843e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	1	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$6.982e+01$			$6.982e+01$		
20	$5.00e-02$	$3.372e+01$	1.1	$7.835e+02$	$3.372e+01$	1.1	$7.835e+02$
40	$2.50e-02$	$1.656e+01$	1.0	$7.285e+02$	$1.656e+01$	1.0	$7.285e+02$
80	$1.25e-02$	$8.205e+00$	1.0	$6.951e+02$	$8.205e+00$	1.0	$6.951e+02$
160	$6.25e-03$	$4.084e+00$	1.0	$6.756e+02$	$4.084e+00$	1.0	$6.756e+02$
320	$3.13e-03$	$2.037e+00$	1.0	$6.645e+02$	$2.037e+00$	1.0	$6.645e+02$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$5.566e+01$			$5.566e+01$		
20	$5.00e-02$	$2.587e+01$	1.1	$7.095e+02$	$2.587e+01$	1.1	$7.095e+02$
40	$2.50e-02$	$1.246e+01$	1.1	$6.077e+02$	$1.246e+01$	1.1	$6.077e+02$
80	$1.25e-02$	$6.115e+00$	1.0	$5.505e+02$	$6.115e+00$	1.0	$5.505e+02$
160	$6.25e-03$	$3.029e+00$	1.0	$5.191e+02$	$3.029e+00$	1.0	$5.191e+02$
320	$3.13e-03$	$1.507e+00$	1.0	$5.016e+02$	$1.507e+00$	1.0	$5.016e+02$

Table 182: Numerical experiment `lin43` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.345e+00$			$1.348e+00$		
20	$5.00e-02$	$3.359e-01$	2.0	$1.350e+02$	$3.662e-01$	1.9	$1.022e+02$
40	$2.50e-02$	$8.392e-02$	2.0	$1.346e+02$	$9.550e-02$	1.9	$1.220e+02$
80	$1.25e-02$	$2.098e-02$	2.0	$1.344e+02$	$2.439e-02$	2.0	$1.364e+02$
160	$6.25e-03$	$5.243e-03$	2.0	$1.343e+02$	$6.163e-03$	2.0	$1.459e+02$
320	$3.13e-03$	$1.311e-03$	2.0	$1.343e+02$	$1.549e-03$	2.0	$1.517e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.345e+00$			$1.345e+00$		
20	$5.00e-02$	$3.359e-01$	2.0	$1.350e+02$	$3.359e-01$	2.0	$1.350e+02$
40	$2.50e-02$	$8.392e-02$	2.0	$1.346e+02$	$8.392e-02$	2.0	$1.346e+02$
80	$1.25e-02$	$2.098e-02$	2.0	$1.344e+02$	$2.098e-02$	2.0	$1.344e+02$
160	$6.25e-03$	$5.243e-03$	2.0	$1.343e+02$	$5.243e-03$	2.0	$1.343e+02$
320	$3.13e-03$	$1.311e-03$	2.0	$1.343e+02$	$1.311e-03$	2.0	$1.343e+02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.841e+00$			$1.841e+00$		
20	$5.00e-02$	$4.618e-01$	2.0	$1.820e+02$	$4.618e-01$	2.0	$1.820e+02$
40	$2.50e-02$	$1.156e-01$	2.0	$1.840e+02$	$1.156e-01$	2.0	$1.840e+02$
80	$1.25e-02$	$2.890e-02$	2.0	$1.847e+02$	$2.890e-02$	2.0	$1.847e+02$
160	$6.25e-03$	$7.224e-03$	2.0	$1.849e+02$	$7.224e-03$	2.0	$1.849e+02$
320	$3.13e-03$	$1.806e-03$	2.0	$1.849e+02$	$1.806e-03$	2.0	$1.849e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.047e-03$			$2.756e-02$		
20	$5.00e-02$	$7.422e-04$	3.2	$1.245e+01$	$3.607e-03$	2.9	$2.365e+01$
40	$2.50e-02$	$8.301e-05$	3.2	$9.601e+00$	$4.617e-04$	3.0	$2.605e+01$
80	$1.25e-02$	$9.694e-06$	3.1	$7.627e+00$	$5.841e-05$	3.0	$2.772e+01$
160	$6.25e-03$	$1.165e-06$	3.1	$6.378e+00$	$7.346e-06$	3.0	$2.878e+01$
320	$3.13e-03$	$1.424e-07$	3.0	$5.622e+00$	$9.211e-07$	3.0	$2.943e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.046e-01$			$3.809e-01$		
20	$5.00e-02$	$1.290e-02$	3.0	$1.091e+02$	$5.158e-02$	2.9	$2.919e+02$
40	$2.50e-02$	$1.627e-03$	3.0	$9.944e+01$	$6.711e-03$	2.9	$3.471e+02$
80	$1.25e-02$	$2.075e-04$	3.0	$9.347e+01$	$8.558e-04$	3.0	$3.861e+02$
160	$6.25e-03$	$2.663e-05$	3.0	$9.007e+01$	$1.080e-04$	3.0	$4.113e+02$
320	$3.13e-03$	$3.426e-06$	3.0	$8.834e+01$	$1.357e-05$	3.0	$4.267e+02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.046e-01$			$1.061e-01$		
20	$5.00e-02$	$1.290e-02$	3.0	$1.091e+02$	$1.451e-02$	2.9	$7.858e+01$
40	$2.50e-02$	$1.627e-03$	3.0	$9.944e+01$	$1.898e-03$	2.9	$9.549e+01$
80	$1.25e-02$	$2.075e-04$	3.0	$9.347e+01$	$2.426e-04$	3.0	$1.077e+02$
160	$6.25e-03$	$2.663e-05$	3.0	$9.007e+01$	$3.067e-05$	3.0	$1.157e+02$
320	$3.13e-03$	$3.426e-06$	3.0	$8.834e+01$	$3.856e-06$	3.0	$1.205e+02$

Table 183: Numerical experiment `lin43` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.598e-02$			$1.598e-02$		
20	$5.00e-02$	$1.011e-03$	4.0	$1.536e+02$	$1.011e-03$	4.0	$1.536e+02$
40	$2.50e-02$	$6.361e-05$	4.0	$1.571e+02$	$6.361e-05$	4.0	$1.571e+02$
80	$1.25e-02$	$4.158e-06$	3.9	$1.284e+02$	$4.158e-06$	3.9	$1.284e+02$
160	$6.25e-03$	$2.657e-07$	4.0	$1.481e+02$	$2.657e-07$	4.0	$1.481e+02$
320	$3.13e-03$	$1.678e-08$	4.0	$1.612e+02$	$1.678e-08$	4.0	$1.612e+02$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.771e-03$			$4.771e-03$		
20	$5.00e-02$	$3.220e-04$	3.9	$3.697e+01$	$3.220e-04$	3.9	$3.697e+01$
40	$2.50e-02$	$2.163e-05$	3.9	$3.771e+01$	$2.163e-05$	3.9	$3.771e+01$
80	$1.25e-02$	$1.447e-06$	3.9	$3.856e+01$	$1.447e-06$	3.9	$3.856e+01$
160	$6.25e-03$	$9.642e-08$	3.9	$3.956e+01$	$9.642e-08$	3.9	$3.956e+01$
320	$3.13e-03$	$6.398e-09$	3.9	$4.076e+01$	$6.398e-09$	3.9	$4.076e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.845e-03$			$9.845e-03$		
20	$5.00e-02$	$6.218e-04$	4.0	$9.507e+01$	$6.218e-04$	4.0	$9.507e+01$
40	$2.50e-02$	$3.897e-05$	4.0	$9.837e+01$	$3.897e-05$	4.0	$9.837e+01$
80	$1.25e-02$	$2.525e-06$	3.9	$8.232e+01$	$2.525e-06$	3.9	$8.232e+01$
160	$6.25e-03$	$1.614e-07$	4.0	$8.972e+01$	$1.614e-07$	4.0	$8.972e+01$
320	$3.13e-03$	$1.023e-08$	4.0	$9.555e+01$	$1.023e-08$	4.0	$9.555e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.839e-04$			$6.305e-04$		
20	$5.00e-02$	$1.717e-05$	4.0	$3.168e+00$	$4.310e-05$	3.9	$4.681e+00$
40	$2.50e-02$	$1.055e-06$	4.0	$2.952e+00$	$2.817e-06$	3.9	$5.684e+00$
80	$1.25e-02$	$6.542e-08$	4.0	$2.824e+00$	$1.800e-07$	4.0	$6.403e+00$
160	$6.25e-03$	$4.080e-09$	4.0	$2.716e+00$	$1.138e-08$	4.0	$6.853e+00$
320	$3.13e-03$	$2.733e-10$	3.9	$1.609e+00$	$7.252e-10$	4.0	$6.484e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.361e-04$			$7.924e-03$		
20	$5.00e-02$	$5.633e-05$	4.1	$1.061e+01$	$5.465e-04$	3.9	$5.713e+01$
40	$2.50e-02$	$3.448e-06$	4.0	$9.860e+00$	$3.587e-05$	3.9	$7.074e+01$
80	$1.25e-02$	$2.131e-07$	4.0	$9.378e+00$	$2.298e-06$	4.0	$8.062e+01$
160	$6.25e-03$	$1.323e-08$	4.0	$9.091e+00$	$1.454e-07$	4.0	$8.713e+01$
320	$3.13e-03$	$8.165e-10$	4.0	$9.524e+00$	$9.129e-09$	4.0	$9.193e+01$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.361e-04$			$1.549e-03$		
20	$5.00e-02$	$5.633e-05$	4.1	$1.061e+01$	$9.945e-05$	4.0	$1.418e+01$
40	$2.50e-02$	$3.448e-06$	4.0	$9.860e+00$	$6.301e-06$	4.0	$1.500e+01$
80	$1.25e-02$	$2.131e-07$	4.0	$9.378e+00$	$3.965e-07$	4.0	$1.555e+01$
160	$6.25e-03$	$1.323e-08$	4.0	$9.091e+00$	$2.487e-08$	4.0	$1.588e+01$
320	$3.13e-03$	$8.165e-10$	4.0	$9.524e+00$	$1.561e-09$	4.0	$1.580e+01$

Table 184: Numerical experiment `lin43` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.416e-03$			$1.439e-03$		
20	$5.00e-02$	$8.824e-05$	4.0	$1.430e+01$	$9.834e-05$	3.9	$1.071e+01$
40	$2.50e-02$	$5.507e-06$	4.0	$1.421e+01$	$6.430e-06$	3.9	$1.294e+01$
80	$1.25e-02$	$3.439e-07$	4.0	$1.416e+01$	$4.111e-07$	4.0	$1.458e+01$
160	$6.25e-03$	$2.149e-08$	4.0	$1.410e+01$	$2.600e-08$	4.0	$1.565e+01$
320	$3.13e-03$	$1.351e-09$	4.0	$1.352e+01$	$1.648e-09$	4.0	$1.534e+01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.416e-03$			$1.416e-03$		
20	$5.00e-02$	$8.824e-05$	4.0	$1.430e+01$	$8.824e-05$	4.0	$1.430e+01$
40	$2.50e-02$	$5.507e-06$	4.0	$1.421e+01$	$5.507e-06$	4.0	$1.421e+01$
80	$1.25e-02$	$3.439e-07$	4.0	$1.416e+01$	$3.439e-07$	4.0	$1.416e+01$
160	$6.25e-03$	$2.149e-08$	4.0	$1.410e+01$	$2.149e-08$	4.0	$1.410e+01$
320	$3.13e-03$	$1.351e-09$	4.0	$1.352e+01$	$1.351e-09$	4.0	$1.352e+01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.137e-03$			$1.137e-03$		
20	$5.00e-02$	$7.125e-05$	4.0	$1.126e+01$	$7.125e-05$	4.0	$1.126e+01$
40	$2.50e-02$	$4.456e-06$	4.0	$1.136e+01$	$4.456e-06$	4.0	$1.136e+01$
80	$1.25e-02$	$2.786e-07$	4.0	$1.140e+01$	$2.786e-07$	4.0	$1.140e+01$
160	$6.25e-03$	$1.741e-08$	4.0	$1.139e+01$	$1.741e-08$	4.0	$1.139e+01$
320	$3.13e-03$	$1.097e-09$	4.0	$1.078e+01$	$1.097e-09$	4.0	$1.078e+01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.959e-06$			$1.100e-05$		
20	$5.00e-02$	$6.168e-08$	5.0	$1.911e-01$	$3.688e-07$	4.9	$8.712e-01$
40	$2.50e-02$	$1.942e-09$	5.0	$1.910e-01$	$1.193e-08$	4.9	$1.015e+00$
80	$1.25e-02$	$6.045e-11$	5.0	$2.033e-01$	$3.793e-10$	5.0	$1.117e+00$
160	$6.25e-03$	$1.563e-12$	5.3	$6.557e-01$	$1.211e-11$	5.0	$1.087e+00$
320	$3.13e-03$	$2.043e-12$	-0.4	$2.200e-13$	$2.138e-12$	2.5	$3.954e-06$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.315e-06$			$1.313e-04$		
20	$5.00e-02$	$1.662e-07$	5.0	$5.302e-01$	$4.423e-06$	4.9	$1.022e+01$
40	$2.50e-02$	$5.236e-09$	5.0	$5.137e-01$	$1.435e-07$	4.9	$1.205e+01$
80	$1.25e-02$	$1.787e-10$	4.9	$3.351e-01$	$4.546e-09$	5.0	$1.364e+01$
160	$6.25e-03$	$4.615e-11$	2.0	$9.326e-07$	$1.816e-10$	4.6	$3.161e+00$
320	$3.13e-03$	$9.319e-11$	-1.0	$2.689e-13$	$9.569e-11$	0.9	$1.975e-08$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.315e-06$			$2.214e-05$		
20	$5.00e-02$	$1.662e-07$	5.0	$5.302e-01$	$7.231e-07$	4.9	$1.913e+00$
40	$2.50e-02$	$5.236e-09$	5.0	$5.137e-01$	$2.342e-08$	4.9	$1.980e+00$
80	$1.25e-02$	$1.787e-10$	4.9	$3.351e-01$	$7.530e-10$	5.0	$2.064e+00$
160	$6.25e-03$	$3.508e-11$	2.3	$5.284e-06$	$3.963e-11$	4.2	$9.145e-02$
320	$3.13e-03$	$6.151e-11$	-0.8	$5.742e-13$	$6.161e-11$	-0.6	$1.566e-12$

Table 185: Numerical experiment `lin43` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.167e-05$			$1.167e-05$		
20	$5.00e-02$	$1.831e-07$	6.0	$1.154e+01$	$1.831e-07$	6.0	$1.154e+01$
40	$2.50e-02$	$2.865e-09$	6.0	$1.163e+01$	$2.865e-09$	6.0	$1.163e+01$
80	$1.25e-02$	$4.443e-11$	6.0	$1.221e+01$	$4.443e-11$	6.0	$1.221e+01$
160	$6.25e-03$	$8.484e-12$	2.4	$1.562e-06$	$8.484e-12$	2.4	$1.562e-06$
320	$3.13e-03$	$1.927e-11$	-1.2	$2.089e-14$	$1.927e-11$	-1.2	$2.089e-14$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.331e-06$			$2.331e-06$		
20	$5.00e-02$	$3.653e-08$	6.0	$2.310e+00$	$3.653e-08$	6.0	$2.310e+00$
40	$2.50e-02$	$5.730e-10$	6.0	$2.300e+00$	$5.730e-10$	6.0	$2.300e+00$
80	$1.25e-02$	$7.814e-12$	6.2	$4.839e+00$	$7.814e-12$	6.2	$4.839e+00$
160	$6.25e-03$	$5.970e-12$	0.4	$4.284e-11$	$5.970e-12$	0.4	$4.284e-11$
320	$3.13e-03$	$6.784e-12$	-0.2	$2.343e-12$	$6.784e-12$	-0.2	$2.343e-12$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.280e-06$			$3.280e-06$		
20	$5.00e-02$	$5.141e-08$	6.0	$3.245e+00$	$5.141e-08$	6.0	$3.245e+00$
40	$2.50e-02$	$8.050e-10$	6.0	$3.262e+00$	$8.050e-10$	6.0	$3.262e+00$
80	$1.25e-02$	$1.516e-11$	5.7	$1.219e+00$	$1.516e-11$	5.7	$1.219e+00$
160	$6.25e-03$	$6.700e-12$	1.2	$2.649e-09$	$6.700e-12$	1.2	$2.649e-09$
320	$3.13e-03$	$1.179e-11$	-0.8	$1.071e-13$	$1.179e-11$	-0.8	$1.071e-13$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.730e-09$			$1.498e-07$		
20	$5.00e-02$	$8.188e-11$	4.4	$4.351e-05$	$2.514e-09$	5.9	$1.181e-01$
40	$2.50e-02$	$9.885e-13$	6.4	$1.598e-02$	$4.012e-11$	6.0	$1.468e-01$
80	$1.25e-02$	$2.085e-12$	-1.1	$1.860e-14$	$2.108e-12$	4.3	$2.591e-04$
160	$6.25e-03$	$4.757e-12$	-1.2	$1.136e-14$	$4.757e-12$	-1.2	$1.227e-14$
320	$3.13e-03$	$7.616e-12$	-0.7	$1.516e-13$	$7.616e-12$	-0.7	$1.516e-13$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin43	...	6	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.118e-09$			$1.783e-06$		
20	$5.00e-02$	$2.207e-10$	3.3	$3.876e-06$	$2.976e-08$	5.9	$1.432e+00$
40	$2.50e-02$	$9.723e-11$	1.2	$7.620e-09$	$5.631e-10$	5.7	$8.321e-01$
80	$1.25e-02$	$2.030e-10$	-1.1	$1.934e-12$	$2.087e-10$	1.4	$1.110e-07$
160	$6.25e-03$	$4.149e-10$	-1.0	$2.213e-12$	$4.207e-10$	-1.0	$2.479e-12$
320	$3.13e-03$	$8.404e-10$	-1.0	$2.361e-12$	$8.463e-10$	-1.0	$2.519e-12$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.118e-09$			$2.979e-07$		
20	$5.00e-02$	$2.207e-10$	3.3	$3.876e-06$	$4.883e-09$	5.9	$2.540e-01$
40	$2.50e-02$	$6.556e-11$	1.8	$4.185e-08$	$1.023e-10$	5.6	$8.788e-02$
80	$1.25e-02$	$1.331e-10$	-1.0	$1.512e-12$	$1.333e-10$	-0.4	$2.504e-11$
160	$6.25e-03$	$2.732e-10$	-1.0	$1.414e-12$	$2.732e-10$	-1.0	$1.428e-12$
320	$3.13e-03$	$5.549e-10$	-1.0	$1.524e-12$	$5.549e-10$	-1.0	$1.524e-12$

Table 186: Numerical experiment `lin43` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$7.219e-02$			$7.219e-02$		
20	$5.00e-02$	$2.380e-02$	1.6	$2.881e+00$	$2.380e-02$	1.6	$2.881e+00$
40	$2.50e-02$	$6.796e-03$	1.8	$5.359e+00$	$6.796e-03$	1.8	$5.359e+00$
80	$1.25e-02$	$1.814e-03$	1.9	$7.673e+00$	$1.814e-03$	1.9	$7.673e+00$
160	$6.25e-03$	$4.685e-04$	2.0	$9.450e+00$	$4.685e-04$	2.0	$9.450e+00$
320	$3.13e-03$	$1.190e-04$	2.0	$1.065e+01$	$1.190e-04$	2.0	$1.065e+01$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$1.254e-02$			$3.072e-02$		
20	$5.00e-02$	$3.152e-03$	2.0	$1.232e+00$	$8.944e-03$	1.8	$1.853e+00$
40	$2.50e-02$	$7.833e-04$	2.0	$1.295e+00$	$2.420e-03$	1.9	$2.543e+00$
80	$1.25e-02$	$1.955e-04$	2.0	$1.263e+00$	$6.298e-04$	1.9	$3.125e+00$
160	$6.25e-03$	$4.886e-05$	2.0	$1.254e+00$	$1.607e-04$	2.0	$3.544e+00$
320	$3.13e-03$	$1.221e-05$	2.0	$1.252e+00$	$4.059e-05$	2.0	$3.817e+00$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	1	Radau	no

Uniform Mesh		Error for $\boldsymbol{x}$ at Grid `tau`			Error for $\boldsymbol{x}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$4.264e-01$			$4.264e-01$		
20	$5.00e-02$	$1.869e-01$	1.2	$6.602e+00$	$1.869e-01$	1.2	$6.602e+00$
40	$2.50e-02$	$8.825e-02$	1.1	$4.787e+00$	$8.825e-02$	1.1	$4.787e+00$
80	$1.25e-02$	$4.308e-02$	1.0	$4.010e+00$	$4.308e-02$	1.0	$4.010e+00$
160	$6.25e-03$	$2.127e-02$	1.0	$3.730e+00$	$2.127e-02$	1.0	$3.730e+00$
320	$3.13e-03$	$1.057e-02$	1.0	$3.560e+00$	$1.057e-02$	1.0	$3.560e+00$

Uniform Mesh		Error for $\boldsymbol{u}$ at Grid `tau`			Error for $\boldsymbol{u}$ at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-01$	$2.243e-01$			$2.243e-01$		
20	$5.00e-02$	$1.007e-01$	1.2	$3.205e+00$	$1.007e-01$	1.2	$3.205e+00$
40	$2.50e-02$	$4.811e-02$	1.1	$2.459e+00$	$4.811e-02$	1.1	$2.459e+00$
80	$1.25e-02$	$2.357e-02$	1.0	$2.142e+00$	$2.357e-02$	1.0	$2.142e+00$
160	$6.25e-03$	$1.167e-02$	1.0	$2.010e+00$	$1.167e-02$	1.0	$2.010e+00$
320	$3.13e-03$	$5.805e-03$	1.0	$1.936e+00$	$5.805e-03$	1.0	$1.936e+00$

Table 187: Numerical experiment `lin44` with midpoint collocation (top) and $m = 1$ Radau collocation points (bottom).

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.036e-02$			$2.036e-02$		
20	$5.00e-02$	$5.100e-03$	2.0	$2.025e+00$	$5.100e-03$	2.0	$2.025e+00$
40	$2.50e-02$	$1.275e-03$	2.0	$2.036e+00$	$1.275e-03$	2.0	$2.036e+00$
80	$1.25e-02$	$3.189e-04$	2.0	$2.040e+00$	$3.189e-04$	2.0	$2.040e+00$
160	$6.25e-03$	$7.972e-05$	2.0	$2.041e+00$	$7.972e-05$	2.0	$2.041e+00$
320	$3.13e-03$	$1.993e-05$	2.0	$2.041e+00$	$1.993e-05$	2.0	$2.041e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.941e-03$			$2.136e-03$		
20	$5.00e-02$	$4.691e-04$	2.0	$2.173e-01$	$5.048e-04$	2.1	$2.574e-01$
40	$2.50e-02$	$1.172e-04$	2.0	$1.885e-01$	$1.214e-04$	2.1	$2.384e-01$
80	$1.25e-02$	$2.922e-05$	2.0	$1.899e-01$	$2.981e-05$	2.0	$2.143e-01$
160	$6.25e-03$	$7.301e-06$	2.0	$1.877e-01$	$7.378e-06$	2.0	$2.032e-01$
320	$3.13e-03$	$1.825e-06$	2.0	$1.871e-01$	$1.835e-06$	2.0	$1.963e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.528e-02$			$1.528e-02$		
20	$5.00e-02$	$3.825e-03$	2.0	$1.520e+00$	$3.825e-03$	2.0	$1.520e+00$
40	$2.50e-02$	$9.566e-04$	2.0	$1.528e+00$	$9.566e-04$	2.0	$1.528e+00$
80	$1.25e-02$	$2.392e-04$	2.0	$1.530e+00$	$2.392e-04$	2.0	$1.530e+00$
160	$6.25e-03$	$5.979e-05$	2.0	$1.530e+00$	$5.979e-05$	2.0	$1.530e+00$
320	$3.13e-03$	$1.495e-05$	2.0	$1.531e+00$	$1.495e-05$	2.0	$1.531e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.287e-04$			$6.844e-04$		
20	$5.00e-02$	$1.675e-05$	2.9	$1.125e-01$	$8.830e-05$	3.0	$6.162e-01$
40	$2.50e-02$	$2.107e-06$	3.0	$1.303e-01$	$1.113e-05$	3.0	$6.821e-01$
80	$1.25e-02$	$2.633e-07$	3.0	$1.350e-01$	$1.393e-06$	3.0	$7.053e-01$
160	$6.25e-03$	$3.289e-08$	3.0	$1.356e-01$	$1.742e-07$	3.0	$7.121e-01$
320	$3.13e-03$	$4.108e-09$	3.0	$1.354e-01$	$2.178e-08$	3.0	$7.137e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	2	Radau	no

Uniform Mesh		Error for x at Grid `tau`			Error for x at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.964e-03$			$3.836e-03$		
20	$5.00e-02$	$2.293e-04$	3.1	$2.461e+00$	$5.398e-04$	2.8	$2.588e+00$
40	$2.50e-02$	$2.757e-05$	3.1	$2.170e+00$	$7.161e-05$	2.9	$3.341e+00$
80	$1.25e-02$	$3.383e-06$	3.0	$1.950e+00$	$9.221e-06$	3.0	$3.912e+00$
160	$6.25e-03$	$4.189e-07$	3.0	$1.836e+00$	$1.170e-06$	3.0	$4.297e+00$
320	$3.13e-03$	$5.213e-08$	3.0	$1.774e+00$	$1.473e-07$	3.0	$4.538e+00$

Uniform Mesh		Error for u at Grid `tau`			Error for u at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$9.237e-04$			$1.670e-03$		
20	$5.00e-02$	$1.089e-04$	3.1	$1.123e+00$	$2.346e-04$	2.8	$1.132e+00$
40	$2.50e-02$	$1.316e-05$	3.0	$1.007e+00$	$3.110e-05$	2.9	$1.456e+00$
80	$1.25e-02$	$1.619e-06$	3.0	$9.172e-01$	$4.004e-06$	3.0	$1.702e+00$
160	$6.25e-03$	$2.008e-07$	3.0	$8.708e-01$	$5.079e-07$	3.0	$1.868e+00$
320	$3.13e-03$	$2.500e-08$	3.0	$8.459e-01$	$6.395e-08$	3.0	$1.971e+00$

Table 188: Numerical experiment `lin44` with $m = 2$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$8.443e-05$			$8.443e-05$		
20	$5.00e-02$	$5.278e-06$	4.0	$8.441e-01$	$5.278e-06$	4.0	$8.441e-01$
40	$2.50e-02$	$3.299e-07$	4.0	$8.443e-01$	$3.299e-07$	4.0	$8.443e-01$
80	$1.25e-02$	$2.062e-08$	4.0	$8.444e-01$	$2.062e-08$	4.0	$8.444e-01$
160	$6.25e-03$	$1.289e-09$	4.0	$8.442e-01$	$1.289e-09$	4.0	$8.442e-01$
320	$3.13e-03$	$8.046e-11$	4.0	$8.505e-01$	$8.046e-11$	4.0	$8.505e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.788e-05$			$2.210e-05$		
20	$5.00e-02$	$1.114e-06$	4.0	$1.804e-01$	$1.517e-06$	3.9	$1.620e-01$
40	$2.50e-02$	$6.958e-08$	4.0	$1.791e-01$	$9.929e-08$	3.9	$1.987e-01$
80	$1.25e-02$	$4.348e-09$	4.0	$1.784e-01$	$6.350e-09$	4.0	$2.249e-01$
160	$6.25e-03$	$2.717e-10$	4.0	$1.781e-01$	$4.014e-10$	4.0	$2.419e-01$
320	$3.13e-03$	$1.698e-11$	4.0	$1.781e-01$	$2.524e-11$	4.0	$2.519e-01$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$4.503e-05$			$4.503e-05$		
20	$5.00e-02$	$2.815e-06$	4.0	$4.502e-01$	$2.815e-06$	4.0	$4.502e-01$
40	$2.50e-02$	$1.759e-07$	4.0	$4.503e-01$	$1.759e-07$	4.0	$4.503e-01$
80	$1.25e-02$	$1.100e-08$	4.0	$4.504e-01$	$1.100e-08$	4.0	$4.504e-01$
160	$6.25e-03$	$6.872e-10$	4.0	$4.502e-01$	$6.872e-10$	4.0	$4.502e-01$
320	$3.13e-03$	$4.291e-11$	4.0	$4.536e-01$	$4.291e-11$	4.0	$4.536e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.032e-07$			$8.842e-06$		
20	$5.00e-02$	$1.933e-08$	5.2	$1.077e-01$	$5.732e-07$	3.9	$7.831e-02$
40	$2.50e-02$	$5.050e-10$	5.3	$1.340e-01$	$3.638e-08$	4.0	$8.577e-02$
80	$1.25e-02$	$6.065e-11$	3.1	$4.001e-05$	$2.290e-09$	4.0	$8.973e-02$
160	$6.25e-03$	$4.833e-12$	3.6	$5.349e-04$	$1.436e-10$	4.0	$9.172e-02$
320	$3.13e-03$	$3.343e-13$	3.9	$1.508e-03$	$9.042e-12$	4.0	$8.918e-02$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	3	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.320e-06$			$4.960e-05$		
20	$5.00e-02$	$1.779e-07$	5.2	$8.934e-01$	$3.075e-06$	4.0	$5.091e-01$
40	$2.50e-02$	$5.060e-09$	5.1	$8.559e-01$	$1.903e-07$	4.0	$5.139e-01$
80	$1.25e-02$	$2.981e-10$	4.1	$1.774e-02$	$1.181e-08$	4.0	$5.049e-01$
160	$6.25e-03$	$2.412e-11$	3.6	$2.388e-03$	$7.355e-10$	4.0	$4.957e-01$
320	$3.13e-03$	$1.675e-12$	3.8	$7.316e-03$	$4.589e-11$	4.0	$4.885e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.551e-06$			$2.117e-05$		
20	$5.00e-02$	$7.236e-08$	5.1	$3.520e-01$	$1.312e-06$	4.0	$2.176e-01$
40	$2.50e-02$	$2.124e-09$	5.1	$3.037e-01$	$8.119e-08$	4.0	$2.195e-01$
80	$1.25e-02$	$1.278e-10$	4.1	$6.660e-03$	$5.040e-09$	4.0	$2.156e-01$
160	$6.25e-03$	$1.034e-11$	3.6	$1.023e-03$	$3.138e-10$	4.0	$2.115e-01$
320	$3.13e-03$	$7.178e-13$	3.8	$3.136e-03$	$1.959e-11$	4.0	$2.069e-01$

Table 189: Numerical experiment `lin44` with $m = 3$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.383e-05$			$1.383e-05$		
20	$5.00e-02$	$8.647e-07$	4.0	$1.383e-01$	$8.647e-07$	4.0	$1.383e-01$
40	$2.50e-02$	$5.404e-08$	4.0	$1.383e-01$	$5.404e-08$	4.0	$1.383e-01$
80	$1.25e-02$	$3.378e-09$	4.0	$1.383e-01$	$3.378e-09$	4.0	$1.383e-01$
160	$6.25e-03$	$2.117e-10$	4.0	$1.360e-01$	$2.117e-10$	4.0	$1.360e-01$
320	$3.13e-03$	$1.375e-11$	3.9	$1.045e-01$	$1.375e-11$	3.9	$1.045e-01$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.481e-07$			$6.455e-07$		
20	$5.00e-02$	$3.327e-08$	4.0	$6.035e-03$	$3.661e-08$	4.1	$8.912e-03$
40	$2.50e-02$	$2.060e-09$	4.0	$5.545e-03$	$2.176e-09$	4.1	$7.288e-03$
80	$1.25e-02$	$1.285e-10$	4.0	$5.333e-03$	$1.322e-10$	4.0	$6.474e-03$
160	$6.25e-03$	$8.032e-12$	4.0	$5.257e-03$	$8.150e-12$	4.0	$5.900e-03$
320	$3.13e-03$	$5.155e-13$	4.0	$4.337e-03$	$5.194e-13$	4.0	$4.628e-03$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.147e-06$			$5.147e-06$		
20	$5.00e-02$	$3.217e-07$	4.0	$5.146e-02$	$3.217e-07$	4.0	$5.146e-02$
40	$2.50e-02$	$2.011e-08$	4.0	$5.147e-02$	$2.011e-08$	4.0	$5.147e-02$
80	$1.25e-02$	$1.257e-09$	4.0	$5.146e-02$	$1.257e-09$	4.0	$5.146e-02$
160	$6.25e-03$	$7.858e-11$	4.0	$5.128e-02$	$7.858e-11$	4.0	$5.128e-02$
320	$3.13e-03$	$4.989e-12$	4.0	$4.592e-02$	$4.989e-12$	4.0	$4.592e-02$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.265e-07$			$1.265e-07$		
20	$5.00e-02$	$3.961e-09$	5.0	$1.254e-02$	$3.961e-09$	5.0	$1.254e-02$
40	$2.50e-02$	$1.239e-10$	5.0	$1.261e-02$	$1.239e-10$	5.0	$1.261e-02$
80	$1.25e-02$	$3.875e-12$	5.0	$1.265e-02$	$3.875e-12$	5.0	$1.265e-02$
160	$6.25e-03$	$1.225e-13$	5.0	$1.184e-02$	$1.225e-13$	5.0	$1.184e-02$
320	$3.13e-03$	$1.676e-14$	2.9	$2.577e-07$	$1.776e-14$	2.8	$1.686e-07$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	4	Radau	no

Uniform Mesh		Error for x at Grid tau			Error for x at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$6.649e-07$			$6.649e-07$		
20	$5.00e-02$	$2.083e-08$	5.0	$6.589e-02$	$2.083e-08$	5.0	$6.589e-02$
40	$2.50e-02$	$6.520e-10$	5.0	$6.627e-02$	$6.520e-10$	5.0	$6.627e-02$
80	$1.25e-02$	$2.039e-11$	5.0	$6.644e-02$	$2.039e-11$	5.0	$6.644e-02$
160	$6.25e-03$	$6.313e-13$	5.0	$7.093e-02$	$6.313e-13$	5.0	$7.093e-02$
320	$3.13e-03$	$6.492e-13$	-0.0	$5.145e-13$	$6.543e-13$	-0.1	$4.859e-13$

Uniform Mesh		Error for u at Grid tau			Error for u at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.850e-07$			$2.850e-07$		
20	$5.00e-02$	$8.929e-09$	5.0	$2.824e-02$	$8.929e-09$	5.0	$2.824e-02$
40	$2.50e-02$	$2.794e-10$	5.0	$2.840e-02$	$2.794e-10$	5.0	$2.840e-02$
80	$1.25e-02$	$8.740e-12$	5.0	$2.847e-02$	$8.740e-12$	5.0	$2.847e-02$
160	$6.25e-03$	$2.706e-13$	5.0	$3.040e-02$	$2.706e-13$	5.0	$3.040e-02$
320	$3.13e-03$	$3.019e-13$	-0.2	$1.214e-13$	$3.051e-13$	-0.2	$1.123e-13$

Table 190: Numerical experiment `lin44` with $m = 4$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$7.818e-10$			$7.818e-10$		
20	$5.00e-02$	$1.317e-11$	5.9	$6.095e-04$	$1.317e-11$	5.9	$6.095e-04$
40	$2.50e-02$	$4.985e-13$	4.7	$1.837e-05$	$4.985e-13$	4.7	$1.837e-05$
80	$1.25e-02$	$4.817e-13$	0.0	$5.985e-13$	$4.817e-13$	0.0	$5.985e-13$
160	$6.25e-03$	$5.291e-13$	-0.1	$2.661e-13$	$5.291e-13$	-0.1	$2.661e-13$
320	$3.13e-03$	$1.172e-12$	-1.1	$1.568e-15$	$1.172e-12$	-1.1	$1.568e-15$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.137e-10$			$2.137e-10$		
20	$5.00e-02$	$3.430e-12$	6.0	$1.953e-04$	$3.430e-12$	6.0	$1.953e-04$
40	$2.50e-02$	$6.371e-14$	5.8	$1.039e-04$	$6.371e-14$	5.8	$1.039e-04$
80	$1.25e-02$	$1.554e-14$	2.0	$1.161e-10$	$1.554e-14$	2.0	$1.161e-10$
160	$6.25e-03$	$6.506e-14$	-2.1	$1.823e-18$	$6.506e-14$	-2.1	$1.823e-18$
320	$3.13e-03$	$7.261e-14$	-0.2	$2.912e-14$	$7.283e-14$	-0.2	$2.848e-14$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$3.109e-10$			$3.109e-10$		
20	$5.00e-02$	$5.014e-12$	6.0	$2.800e-04$	$5.014e-12$	6.0	$2.800e-04$
40	$2.50e-02$	$8.926e-14$	5.8	$1.826e-04$	$8.926e-14$	5.8	$1.826e-04$
80	$1.25e-02$	$4.846e-14$	0.9	$2.304e-12$	$4.846e-14$	0.9	$2.304e-12$
160	$6.25e-03$	$6.234e-14$	-0.4	$9.863e-15$	$6.234e-14$	-0.4	$9.863e-15$
320	$3.13e-03$	$1.207e-13$	-1.0	$4.929e-16$	$1.207e-13$	-1.0	$4.929e-16$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$5.484e-11$			$5.484e-11$		
20	$5.00e-02$	$8.828e-13$	6.0	$4.966e-05$	$8.828e-13$	6.0	$4.966e-05$
40	$2.50e-02$	$1.422e-14$	6.0	$4.958e-05$	$1.422e-14$	6.0	$4.958e-05$
80	$1.25e-02$	$6.439e-15$	1.1	$9.630e-13$	$7.550e-15$	0.9	$4.130e-13$
160	$6.25e-03$	$2.098e-14$	-1.7	$3.677e-18$	$2.165e-14$	-1.5	$9.671e-18$
320	$3.13e-03$	$3.075e-14$	-0.6	$1.277e-15$	$3.153e-14$	-0.5	$1.380e-15$

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
lin44	...	6	$1e-13$	5	Radau	no

Uniform Mesh		Error for x at Grid **tau**			Error for x at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$2.827e-10$			$2.827e-10$		
20	$5.00e-02$	$4.551e-12$	6.0	$2.562e-04$	$4.551e-12$	6.0	$2.562e-04$
40	$2.50e-02$	$6.926e-13$	2.7	$1.555e-08$	$6.926e-13$	2.7	$1.555e-08$
80	$1.25e-02$	$1.462e-12$	-1.1	$1.299e-14$	$1.462e-12$	-1.1	$1.299e-14$
160	$6.25e-03$	$2.959e-12$	-1.0	$1.697e-14$	$2.959e-12$	-1.0	$1.697e-14$
320	$3.13e-03$	$6.015e-12$	-1.0	$1.640e-14$	$6.015e-12$	-1.0	$1.640e-14$

Uniform Mesh		Error for u at Grid **tau**			Error for u at Mesh **tcol**		
N	h	error	order	const.	error	order	const.
10	$1.00e-01$	$1.212e-10$			$1.212e-10$		
20	$5.00e-02$	$1.950e-12$	6.0	$1.098e-04$	$1.950e-12$	6.0	$1.098e-04$
40	$2.50e-02$	$2.990e-13$	2.7	$6.458e-09$	$3.690e-13$	2.4	$2.600e-09$
80	$1.25e-02$	$6.513e-13$	-1.1	$4.745e-15$	$7.214e-13$	-1.0	$1.042e-14$
160	$6.25e-03$	$1.345e-12$	-1.0	$6.651e-15$	$1.415e-12$	-1.0	$1.020e-14$
320	$3.13e-03$	$2.746e-12$	-1.0	$7.225e-15$	$2.816e-12$	-1.0	$9.174e-15$

Table 191: Numerical experiment `lin44` with $m = 5$ equidistant (top), Gaussian (middle), and Radau collocation points (bottom), respectively.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for x_1 at Grid `tau`			Error for x_1 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.413e-002$		$1.488e+000$	$1.500e-002$		$1.442e+000$
20	$5.00e-002$	$3.479e-003$	2.0	$1.488e+000$	$3.796e-003$	2.0	$1.488e+000$
40	$2.50e-002$	$8.707e-004$	2.0	$1.385e+000$	$9.503e-004$	2.0	$1.385e+000$
80	$1.25e-002$	$2.175e-004$	2.0	$1.401e+000$	$2.375e-004$	2.0	$1.401e+000$
160	$6.25e-003$	$5.435e-005$	2.0	$1.394e+000$	$5.939e-005$	2.0	$1.394e+000$
320	$3.13e-003$	$1.359e-005$	2.0	$1.392e+000$	$1.485e-005$	2.0	$1.392e+000$

Uniform Mesh		Error for x_2 at Grid `tau`			Error for x_2 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.622e-002$		$1.698e+000$	$1.622e-002$		$1.698e+000$
20	$5.00e-002$	$3.999e-003$	2.0	$1.698e+000$	$3.999e-003$	2.0	$1.698e+000$
40	$2.50e-002$	$9.964e-004$	2.0	$1.623e+000$	$9.964e-004$	2.0	$1.623e+000$
80	$1.25e-002$	$2.489e-004$	2.0	$1.602e+000$	$2.489e-004$	2.0	$1.602e+000$
160	$6.25e-003$	$6.222e-005$	2.0	$1.594e+000$	$6.222e-005$	2.0	$1.594e+000$
320	$3.13e-003$	$1.555e-005$	2.0	$1.593e+000$	$1.555e-005$	2.0	$1.593e+000$

Uniform Mesh		Error for x_3 at Grid `tau`			Error for x_3 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.890e-002$		$1.774e+000$	$1.890e-002$		$1.774e+000$
20	$5.00e-002$	$4.815e-003$	2.0	$1.774e+000$	$4.815e-003$	2.0	$1.774e+000$
40	$2.50e-002$	$1.215e-003$	2.0	$1.848e+000$	$1.215e-003$	2.0	$1.848e+000$
80	$1.25e-002$	$3.053e-004$	2.0	$1.896e+000$	$3.053e-004$	2.0	$1.896e+000$
160	$6.25e-003$	$7.651e-005$	2.0	$1.925e+000$	$7.651e-005$	2.0	$1.925e+000$
320	$3.13e-003$	$1.937e-005$	2.0	$1.789e+000$	$1.937e-005$	2.0	$1.789e+000$

Uniform Mesh		Error for x_4 at Grid `tau`			Error for x_4 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.520e-001$		$1.785e+001$	$2.520e-001$		$1.785e+001$
20	$5.00e-002$	$6.988e-002$	1.9	$1.785e+001$	$6.988e-002$	1.9	$1.785e+001$
40	$2.50e-002$	$1.846e-002$	1.9	$2.204e+001$	$1.846e-002$	1.9	$2.204e+001$
80	$1.25e-002$	$4.747e-003$	2.0	$2.540e+001$	$4.747e-003$	2.0	$2.540e+001$
160	$6.25e-003$	$1.204e-003$	2.0	$2.774e+001$	$1.204e-003$	2.0	$2.774e+001$
320	$3.13e-003$	$3.032e-004$	2.0	$2.922e+001$	$3.032e-004$	2.0	$2.922e+001$

Table 192: Numerical experiment `ewa45013bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.068e-003$		$9.132e-002$	$1.137e-003$		$1.140e-001$
20	$5.00e-002$	$2.798e-004$	1.9	$9.132e-002$	$2.841e-004$	2.0	$9.132e-002$
40	$2.50e-002$	$7.061e-005$	2.0	$1.075e-001$	$7.096e-005$	2.0	$1.075e-001$
80	$1.25e-002$	$1.769e-005$	2.0	$1.116e-001$	$1.772e-005$	2.0	$1.116e-001$
160	$6.25e-003$	$4.426e-006$	2.0	$1.128e-001$	$4.429e-006$	2.0	$1.128e-001$
320	$3.13e-003$	$1.107e-006$	2.0	$1.131e-001$	$1.107e-006$	2.0	$1.131e-001$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.969e-004$		$4.649e-002$	$6.851e-004$		$7.243e-002$
20	$5.00e-002$	$1.609e-004$	1.9	$4.649e-002$	$1.684e-004$	2.0	$4.649e-002$
40	$2.50e-002$	$4.097e-005$	2.0	$5.941e-002$	$4.168e-005$	2.0	$5.941e-002$
80	$1.25e-002$	$1.029e-005$	2.0	$6.390e-002$	$1.036e-005$	2.0	$6.390e-002$
160	$6.25e-003$	$2.576e-006$	2.0	$6.531e-002$	$2.584e-006$	2.0	$6.531e-002$
320	$3.13e-003$	$6.443e-007$	2.0	$6.582e-002$	$6.452e-007$	2.0	$6.582e-002$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.540e-003$		$1.041e-001$	$2.987e-003$		$1.660e-001$
20	$5.00e-002$	$4.331e-004$	1.8	$1.041e-001$	$8.911e-004$	1.7	$1.041e-001$
40	$2.50e-002$	$1.203e-004$	1.8	$1.099e-001$	$2.589e-004$	1.8	$1.099e-001$
80	$1.25e-002$	$3.308e-005$	1.9	$1.159e-001$	$7.374e-005$	1.8	$1.159e-001$
160	$6.25e-003$	$9.023e-006$	1.9	$1.221e-001$	$2.069e-005$	1.8	$1.221e-001$
320	$3.13e-003$	$2.444e-006$	1.9	$1.285e-001$	$5.737e-006$	1.9	$1.285e-001$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.028e-002$		$4.253e+000$	$7.028e-002$		$4.253e+000$
20	$5.00e-002$	$2.044e-002$	1.8	$4.253e+000$	$2.044e-002$	1.8	$4.253e+000$
40	$2.50e-002$	$5.829e-003$	1.8	$4.625e+000$	$5.829e-003$	1.8	$4.625e+000$
80	$1.25e-002$	$1.638e-003$	1.8	$5.013e+000$	$1.638e-003$	1.8	$5.013e+000$
160	$6.25e-003$	$4.545e-004$	1.8	$5.413e+000$	$4.545e-004$	1.8	$5.413e+000$
320	$3.13e-003$	$1.249e-004$	1.9	$5.819e+000$	$1.249e-004$	1.9	$5.819e+000$

Table 193: Numerical experiment `ewa45013bvpsuite` with $m = 2$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.242e-004$		$1.350e-001$	$1.242e-004$		$1.350e-001$
20	$5.00e-002$	$1.514e-005$	3.0	$1.350e-001$	$1.514e-005$	3.0	$1.350e-001$
40	$2.50e-002$	$1.871e-006$	3.0	$1.274e-001$	$1.871e-006$	3.0	$1.274e-001$
80	$1.25e-002$	$2.325e-007$	3.0	$1.233e-001$	$2.325e-007$	3.0	$1.233e-001$
160	$6.25e-003$	$2.899e-008$	3.0	$1.211e-001$	$2.899e-008$	3.0	$1.211e-001$
320	$3.13e-003$	$3.618e-009$	3.0	$1.199e-001$	$3.618e-009$	3.0	$1.199e-001$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.520e-004$		$1.628e-001$	$1.520e-004$		$1.628e-001$
20	$5.00e-002$	$1.861e-005$	3.0	$1.628e-001$	$1.861e-005$	3.0	$1.628e-001$
40	$2.50e-002$	$2.305e-006$	3.0	$1.551e-001$	$2.305e-006$	3.0	$1.551e-001$
80	$1.25e-002$	$2.868e-007$	3.0	$1.511e-001$	$2.868e-007$	3.0	$1.511e-001$
160	$6.25e-003$	$3.577e-008$	3.0	$1.489e-001$	$3.577e-008$	3.0	$1.489e-001$
320	$3.13e-003$	$4.466e-009$	3.0	$1.477e-001$	$4.466e-009$	3.0	$1.477e-001$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.237e-003$		$2.772e-001$	$4.237e-003$		$2.772e-001$
20	$5.00e-002$	$1.203e-003$	1.8	$2.772e-001$	$1.203e-003$	1.8	$2.772e-001$
40	$2.50e-002$	$3.370e-004$	1.8	$2.950e-001$	$3.370e-004$	1.8	$2.950e-001$
80	$1.25e-002$	$9.327e-005$	1.9	$3.137e-001$	$9.327e-005$	1.9	$3.137e-001$
160	$6.25e-003$	$2.557e-005$	1.9	$3.329e-001$	$2.557e-005$	1.9	$3.329e-001$
320	$3.13e-003$	$6.957e-006$	1.9	$3.525e-001$	$6.957e-006$	1.9	$3.525e-001$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.593e-002$		$3.475e+000$	$5.593e-002$		$3.475e+000$
20	$5.00e-002$	$1.614e-002$	1.8	$3.475e+000$	$1.614e-002$	1.8	$3.475e+000$
40	$2.50e-002$	$4.574e-003$	1.8	$3.749e+000$	$4.574e-003$	1.8	$3.749e+000$
80	$1.25e-002$	$1.279e-003$	1.8	$4.037e+000$	$1.279e-003$	1.8	$4.037e+000$
160	$6.25e-003$	$3.536e-004$	1.9	$4.333e+000$	$3.536e-004$	1.9	$4.333e+000$
320	$3.13e-003$	$9.685e-005$	1.9	$4.635e+000$	$9.685e-005$	1.9	$4.635e+000$

Table 194: Numerical experiment `ewa45013bvpsuite` with $m = 2$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.515e-006$		$2.500e-002$	$2.515e-006$		$2.500e-002$
20	$5.00e-002$	$1.574e-007$	4.0	$2.500e-002$	$1.574e-007$	4.0	$2.500e-002$
40	$2.50e-002$	$9.816e-009$	4.0	$2.546e-002$	$9.816e-009$	4.0	$2.546e-002$
80	$1.25e-002$	$6.136e-010$	4.0	$2.510e-002$	$6.136e-010$	4.0	$2.510e-002$
160	$6.25e-003$	$3.835e-011$	4.0	$2.515e-002$	$3.835e-011$	4.0	$2.515e-002$
320	$3.13e-003$	$2.399e-012$	4.0	$2.492e-002$	$2.399e-012$	4.0	$2.492e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.795e-006$		$2.890e-002$	$2.795e-006$		$2.890e-002$
20	$5.00e-002$	$1.729e-007$	4.0	$2.890e-002$	$1.729e-007$	4.0	$2.890e-002$
40	$2.50e-002$	$1.083e-008$	4.0	$2.739e-002$	$1.083e-008$	4.0	$2.739e-002$
80	$1.25e-002$	$6.765e-010$	4.0	$2.782e-002$	$6.765e-010$	4.0	$2.782e-002$
160	$6.25e-003$	$4.228e-011$	4.0	$2.773e-002$	$4.228e-011$	4.0	$2.773e-002$
320	$3.13e-003$	$2.648e-012$	4.0	$2.731e-002$	$2.648e-012$	4.0	$2.731e-002$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.733e-006$		$4.314e-002$	$4.733e-006$		$4.314e-002$
20	$5.00e-002$	$3.042e-007$	4.0	$4.314e-002$	$3.042e-007$	4.0	$4.314e-002$
40	$2.50e-002$	$1.928e-008$	4.0	$4.583e-002$	$1.928e-008$	4.0	$4.583e-002$
80	$1.25e-002$	$1.293e-009$	3.9	$3.394e-002$	$1.293e-009$	3.9	$3.394e-002$
160	$6.25e-003$	$8.717e-011$	3.9	$3.278e-002$	$8.717e-011$	3.9	$3.278e-002$
320	$3.13e-003$	$5.750e-012$	3.9	$3.851e-002$	$5.750e-012$	3.9	$3.851e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.130e-005$		$4.471e-001$	$6.130e-005$		$4.471e-001$
20	$5.00e-002$	$4.213e-006$	3.9	$4.471e-001$	$4.213e-006$	3.9	$4.471e-001$
40	$2.50e-002$	$2.768e-007$	3.9	$5.429e-001$	$2.768e-007$	3.9	$5.429e-001$
80	$1.25e-002$	$2.090e-008$	3.7	$2.592e-001$	$2.090e-008$	3.7	$2.592e-001$
160	$6.25e-003$	$2.930e-009$	2.8	$5.187e-003$	$2.930e-009$	2.8	$5.187e-003$
320	$3.13e-003$	$4.139e-010$	2.8	$4.893e-003$	$4.139e-010$	2.8	$4.893e-003$

Table 195: Numerical experiment `ewa45013bvpsuite` with $m = 3$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.692e-007$		$6.759e-003$	$5.692e-007$		$6.759e-003$
20	$5.00e-002$	$3.378e-008$	4.1	$6.759e-003$	$3.378e-008$	4.1	$6.759e-003$
40	$2.50e-002$	$2.057e-009$	4.0	$6.050e-003$	$2.057e-009$	4.0	$6.050e-003$
80	$1.25e-002$	$1.269e-010$	4.0	$5.646e-003$	$1.269e-010$	4.0	$5.646e-003$
160	$6.25e-003$	$7.879e-012$	4.0	$5.418e-003$	$7.879e-012$	4.0	$5.418e-003$
320	$3.13e-003$	$4.908e-013$	4.0	$5.289e-003$	$4.908e-013$	4.0	$5.289e-003$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.802e-007$		$7.105e-003$	$6.590e-007$		$5.928e-003$
20	$5.00e-002$	$3.412e-008$	4.1	$7.105e-003$	$4.252e-008$	4.0	$7.105e-003$
40	$2.50e-002$	$2.067e-009$	4.0	$6.240e-003$	$2.717e-009$	4.0	$6.240e-003$
80	$1.25e-002$	$1.272e-010$	4.0	$5.750e-003$	$1.714e-010$	4.0	$5.750e-003$
160	$6.25e-003$	$7.889e-012$	4.0	$5.475e-003$	$1.076e-011$	4.0	$5.475e-003$
320	$3.13e-003$	$4.911e-013$	4.0	$5.320e-003$	$6.728e-013$	4.0	$5.320e-003$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.590e-006$		$2.467e-002$	$2.590e-006$		$2.467e-002$
20	$5.00e-002$	$1.643e-007$	4.0	$2.467e-002$	$1.643e-007$	4.0	$2.467e-002$
40	$2.50e-002$	$1.035e-008$	4.0	$2.544e-002$	$1.035e-008$	4.0	$2.544e-002$
80	$1.25e-002$	$6.491e-010$	4.0	$2.595e-002$	$6.491e-010$	4.0	$2.595e-002$
160	$6.25e-003$	$4.065e-011$	4.0	$2.627e-002$	$4.065e-011$	4.0	$2.627e-002$
320	$3.13e-003$	$2.545e-012$	4.0	$2.634e-002$	$2.545e-012$	4.0	$2.634e-002$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.183e-005$		$1.329e-001$	$4.183e-005$		$1.299e-001$
20	$5.00e-002$	$3.692e-006$	3.5	$1.329e-001$	$3.717e-006$	3.5	$1.329e-001$
40	$2.50e-002$	$5.425e-007$	2.8	$1.468e-002$	$5.425e-007$	2.8	$1.468e-002$
80	$1.25e-002$	$7.283e-008$	2.9	$2.373e-002$	$7.283e-008$	2.9	$2.373e-002$
160	$6.25e-003$	$9.417e-009$	3.0	$3.012e-002$	$9.417e-009$	3.0	$3.012e-002$
320	$3.13e-003$	$1.197e-009$	3.0	$3.414e-002$	$1.197e-009$	3.0	$3.414e-002$

Table 196: Numerical experiment `ewa45013bvpsuite` with $m = 3$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.627e-007$		$2.460e-003$	$2.722e-007$		$2.758e-003$
20	$5.00e-002$	$1.675e-008$	4.0	$2.460e-003$	$1.694e-008$	4.0	$2.460e-003$
40	$2.50e-002$	$1.055e-009$	4.0	$2.591e-003$	$1.058e-009$	4.0	$2.591e-003$
80	$1.25e-002$	$6.603e-011$	4.0	$2.681e-003$	$6.610e-011$	4.0	$2.681e-003$
160	$6.25e-003$	$4.140e-012$	4.0	$2.649e-003$	$4.141e-012$	4.0	$2.649e-003$
320	$3.13e-003$	$2.657e-013$	4.0	$2.236e-003$	$2.665e-013$	4.0	$2.236e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.511e-007$		$1.282e-003$	$1.641e-007$		$1.688e-003$
20	$5.00e-002$	$9.921e-009$	3.9	$1.282e-003$	$1.017e-008$	4.0	$1.282e-003$
40	$2.50e-002$	$6.260e-010$	4.0	$1.522e-003$	$6.333e-010$	4.0	$1.522e-003$
80	$1.25e-002$	$3.927e-011$	4.0	$1.573e-003$	$3.945e-011$	4.0	$1.573e-003$
160	$6.25e-003$	$2.464e-012$	4.0	$1.567e-003$	$2.468e-012$	4.0	$1.567e-003$
320	$3.13e-003$	$1.584e-013$	4.0	$1.313e-003$	$1.587e-013$	4.0	$1.313e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.945e-007$		$2.943e-003$	$5.854e-007$		$3.833e-003$
20	$5.00e-002$	$2.693e-008$	3.9	$2.943e-003$	$4.156e-008$	3.8	$2.943e-003$
40	$2.50e-002$	$1.828e-009$	3.9	$3.017e-003$	$2.895e-009$	3.8	$3.017e-003$
80	$1.25e-002$	$1.232e-010$	3.9	$3.126e-003$	$1.992e-010$	3.9	$3.126e-003$
160	$6.25e-003$	$8.185e-012$	3.9	$3.439e-003$	$1.361e-011$	3.9	$3.439e-003$
320	$3.13e-003$	$9.057e-013$	3.2	$8.186e-005$	$9.458e-013$	3.8	$8.186e-005$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.423e-005$		$9.697e-002$	$1.423e-005$		$9.697e-002$
20	$5.00e-002$	$9.978e-007$	3.8	$9.697e-002$	$9.978e-007$	3.8	$9.697e-002$
40	$2.50e-002$	$6.900e-008$	3.9	$1.031e-001$	$6.900e-008$	3.9	$1.031e-001$
80	$1.25e-002$	$4.721e-009$	3.9	$1.091e-001$	$4.721e-009$	3.9	$1.091e-001$
160	$6.25e-003$	$3.216e-010$	3.9	$1.123e-001$	$3.216e-010$	3.9	$1.123e-001$
320	$3.13e-003$	$2.667e-011$	3.6	$2.657e-002$	$2.667e-011$	3.6	$2.657e-002$

Table 197: Numerical experiment `ewa45013bvpsuite` with $m = 4$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.921e-009$		$7.961e-004$	$6.921e-009$		$7.961e-004$
20	$5.00e-002$	$2.074e-010$	5.1	$7.961e-004$	$2.074e-010$	5.1	$7.961e-004$
40	$2.50e-002$	$6.343e-012$	5.0	$7.280e-004$	$6.343e-012$	5.0	$7.280e-004$
80	$1.25e-002$	$1.961e-013$	5.0	$6.880e-004$	$1.961e-013$	5.0	$6.880e-004$
160	$6.25e-003$	$6.094e-015$	5.0	$6.652e-004$	$6.094e-015$	5.0	$6.652e-004$
320	$3.13e-003$	$2.609e-015$	1.2	$3.038e-012$	$2.609e-015$	1.2	$3.038e-012$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$8.233e-009$		$9.496e-004$	$8.233e-009$		$9.496e-004$
20	$5.00e-002$	$2.464e-010$	5.1	$9.496e-004$	$2.464e-010$	5.1	$9.496e-004$
40	$2.50e-002$	$7.535e-012$	5.0	$8.669e-004$	$7.535e-012$	5.0	$8.669e-004$
80	$1.25e-002$	$2.329e-013$	5.0	$8.183e-004$	$2.329e-013$	5.0	$8.183e-004$
160	$6.25e-003$	$7.236e-015$	5.0	$7.907e-004$	$7.236e-015$	5.0	$7.907e-004$
320	$3.13e-003$	$6.217e-015$	0.2	$2.199e-014$	$6.217e-015$	0.2	$2.199e-014$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.500e-007$		$4.496e-003$	$5.500e-007$		$4.496e-003$
20	$5.00e-002$	$3.653e-008$	3.9	$4.496e-003$	$3.653e-008$	3.9	$4.496e-003$
40	$2.50e-002$	$2.431e-009$	3.9	$4.456e-003$	$2.431e-009$	3.9	$4.456e-003$
80	$1.25e-002$	$1.616e-010$	3.9	$4.486e-003$	$1.616e-010$	3.9	$4.486e-003$
160	$6.25e-003$	$1.074e-011$	3.9	$4.488e-003$	$1.074e-011$	3.9	$4.488e-003$
320	$3.13e-003$	$7.754e-013$	3.8	$2.444e-003$	$7.754e-013$	3.8	$2.444e-003$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.625e-006$		$4.996e-002$	$6.625e-006$		$4.996e-002$
20	$5.00e-002$	$4.508e-007$	3.9	$4.996e-002$	$4.508e-007$	3.9	$4.996e-002$
40	$2.50e-002$	$3.053e-008$	3.9	$5.099e-002$	$3.053e-008$	3.9	$5.099e-002$
80	$1.25e-002$	$2.057e-009$	3.9	$5.239e-002$	$2.057e-009$	3.9	$5.239e-002$
160	$6.25e-003$	$1.383e-010$	3.9	$5.304e-002$	$1.383e-010$	3.9	$5.304e-002$
320	$3.13e-003$	$1.039e-011$	3.7	$2.352e-002$	$1.039e-011$	3.7	$2.352e-002$

Table 198: Numerical experiment `ewa45013bvpsuite` with $m = 4$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.009e-010$		$2.024e-004$	$2.331e-010$		$2.384e-004$
20	$5.00e-002$	$3.132e-012$	6.0	$2.024e-004$	$3.617e-012$	6.0	$2.024e-004$
40	$2.50e-002$	$6.217e-014$	5.7	$7.128e-005$	$6.595e-014$	5.8	$7.128e-005$
80	$1.25e-002$	$1.660e-014$	1.9	$7.014e-011$	$1.660e-014$	2.0	$7.014e-011$
160	$6.25e-003$	$1.837e-014$	-0.1	$8.728e-015$	$1.837e-014$	-0.1	$8.728e-015$
320	$3.13e-003$	$1.799e-014$	0.0	$2.149e-014$	$1.799e-014$	0.0	$2.149e-014$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.398e-010$		$2.447e-004$	$2.398e-010$		$2.447e-004$
20	$5.00e-002$	$3.725e-012$	6.0	$2.447e-004$	$3.725e-012$	6.0	$2.447e-004$
40	$2.50e-002$	$6.950e-014$	5.7	$1.107e-004$	$6.950e-014$	5.7	$1.107e-004$
80	$1.25e-002$	$1.377e-014$	2.3	$3.838e-010$	$1.377e-014$	2.3	$3.838e-010$
160	$6.25e-003$	$4.352e-014$	-1.7	$9.522e-018$	$4.352e-014$	-1.7	$9.522e-018$
320	$3.13e-003$	$2.487e-014$	0.8	$2.619e-012$	$2.487e-014$	0.8	$2.619e-012$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.612e-009$		$1.331e-004$	$1.612e-009$		$1.331e-004$
20	$5.00e-002$	$5.338e-011$	4.9	$1.331e-004$	$5.338e-011$	4.9	$1.331e-004$
40	$2.50e-002$	$1.869e-012$	4.8	$1.044e-004$	$1.869e-012$	4.8	$1.044e-004$
80	$1.25e-002$	$3.523e-013$	2.4	$1.346e-008$	$3.523e-013$	2.4	$1.346e-008$
160	$6.25e-003$	$2.138e-013$	0.7	$8.271e-012$	$2.138e-013$	0.7	$8.271e-012$
320	$3.13e-003$	$5.626e-013$	-1.4	$1.795e-016$	$5.626e-013$	-1.4	$1.795e-016$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.025e-008$		$5.192e-004$	$1.025e-008$		$5.192e-004$
20	$5.00e-002$	$3.933e-010$	4.7	$5.192e-004$	$3.933e-010$	4.7	$5.192e-004$
40	$2.50e-002$	$1.646e-011$	4.6	$3.563e-004$	$1.646e-011$	4.6	$3.563e-004$
80	$1.25e-002$	$5.131e-012$	1.7	$8.127e-009$	$5.131e-012$	1.7	$8.127e-009$
160	$6.25e-003$	$2.693e-012$	0.9	$3.022e-010$	$2.693e-012$	0.9	$3.022e-010$
320	$3.13e-003$	$8.754e-012$	-1.7	$4.800e-016$	$8.754e-012$	-1.7	$4.800e-016$

Table 199: Numerical experiment `ewa45013bvpsuite` with $m = 5$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa45013bvpsuite	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.147e-011$		$5.473e-005$	$5.147e-011$		$5.473e-005$
20	$5.00e-002$	$7.894e-013$	6.0	$5.473e-005$	$7.894e-013$	6.0	$5.473e-005$
40	$2.50e-002$	$1.216e-014$	6.0	$5.370e-005$	$1.216e-014$	6.0	$5.370e-005$
80	$1.25e-002$	$7.577e-015$	0.7	$1.508e-013$	$7.577e-015$	0.7	$1.508e-013$
160	$6.25e-003$	$9.243e-015$	-0.3	$2.158e-015$	$9.243e-015$	-0.3	$2.158e-015$
320	$3.13e-003$	$8.493e-015$	0.1	$1.717e-014$	$8.493e-015$	0.1	$1.717e-014$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.277e-011$		$6.650e-005$	$6.277e-011$		$6.650e-005$
20	$5.00e-002$	$9.638e-013$	6.0	$6.650e-005$	$9.638e-013$	6.0	$6.650e-005$
40	$2.50e-002$	$1.487e-014$	6.0	$6.516e-005$	$1.487e-014$	6.0	$6.516e-005$
80	$1.25e-002$	$4.829e-015$	1.6	$5.909e-012$	$4.829e-015$	1.6	$5.909e-012$
160	$6.25e-003$	$6.328e-015$	-0.4	$8.746e-016$	$6.328e-015$	-0.4	$8.746e-016$
320	$3.13e-003$	$9.326e-015$	-0.6	$3.700e-016$	$9.326e-015$	-0.6	$3.700e-016$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.004e-009$		$3.015e-004$	$3.004e-009$		$3.015e-004$
20	$5.00e-002$	$9.378e-011$	5.0	$3.015e-004$	$9.378e-011$	5.0	$3.015e-004$
40	$2.50e-002$	$2.950e-012$	5.0	$2.916e-004$	$2.950e-012$	5.0	$2.916e-004$
80	$1.25e-002$	$1.108e-013$	4.7	$1.136e-004$	$1.108e-013$	4.7	$1.136e-004$
160	$6.25e-003$	$2.343e-014$	2.2	$2.046e-009$	$2.642e-014$	2.1	$2.046e-009$
320	$3.13e-003$	$5.473e-014$	-1.2	$4.689e-017$	$5.473e-014$	-1.1	$4.689e-017$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.004e-008$		$1.904e-003$	$2.004e-008$		$1.904e-003$
20	$5.00e-002$	$6.359e-010$	5.0	$1.904e-003$	$6.359e-010$	5.0	$1.904e-003$
40	$2.50e-002$	$1.994e-011$	5.0	$2.003e-003$	$1.994e-011$	5.0	$2.003e-003$
80	$1.25e-002$	$5.315e-013$	5.2	$4.768e-003$	$5.315e-013$	5.2	$4.768e-003$
160	$6.25e-003$	$1.658e-013$	1.7	$8.377e-010$	$1.658e-013$	1.7	$8.377e-010$
320	$3.13e-003$	$4.729e-013$	-1.5	$7.722e-017$	$4.729e-013$	-1.5	$7.722e-017$

Table 200: Numerical experiment `ewa45013bvpsuite` with $m = 5$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	1	e	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.413e-002$		$1.488e+000$	$1.500e-002$		$1.442e+000$
20	$5.00e-002$	$3.479e-003$	2.0	$1.488e+000$	$3.796e-003$	2.0	$1.488e+000$
40	$2.50e-002$	$8.707e-004$	2.0	$1.385e+000$	$9.503e-004$	2.0	$1.385e+000$
80	$1.25e-002$	$2.175e-004$	2.0	$1.401e+000$	$2.375e-004$	2.0	$1.401e+000$
160	$6.25e-003$	$5.435e-005$	2.0	$1.394e+000$	$5.939e-005$	2.0	$1.394e+000$
320	$3.13e-003$	$1.359e-005$	2.0	$1.392e+000$	$1.485e-005$	2.0	$1.392e+000$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.622e-002$		$1.698e+000$	$1.622e-002$		$1.698e+000$
20	$5.00e-002$	$3.999e-003$	2.0	$1.698e+000$	$3.999e-003$	2.0	$1.698e+000$
40	$2.50e-002$	$9.964e-004$	2.0	$1.623e+000$	$9.964e-004$	2.0	$1.623e+000$
80	$1.25e-002$	$2.489e-004$	2.0	$1.602e+000$	$2.489e-004$	2.0	$1.602e+000$
160	$6.25e-003$	$6.222e-005$	2.0	$1.594e+000$	$6.222e-005$	2.0	$1.594e+000$
320	$3.13e-003$	$1.555e-005$	2.0	$1.593e+000$	$1.555e-005$	2.0	$1.593e+000$

Uniform Mesh		**Error for x_3 at Grid tau**			**Error for x_3 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.890e-002$		$1.774e+000$	$1.890e-002$		$1.774e+000$
20	$5.00e-002$	$4.815e-003$	2.0	$1.774e+000$	$4.815e-003$	2.0	$1.774e+000$
40	$2.50e-002$	$1.215e-003$	2.0	$1.848e+000$	$1.215e-003$	2.0	$1.848e+000$
80	$1.25e-002$	$3.053e-004$	2.0	$1.896e+000$	$3.053e-004$	2.0	$1.896e+000$
160	$6.25e-003$	$7.651e-005$	2.0	$1.925e+000$	$7.651e-005$	2.0	$1.925e+000$
320	$3.13e-003$	$1.937e-005$	2.0	$1.789e+000$	$1.937e-005$	2.0	$1.789e+000$

Uniform Mesh		**Error for x_4 at Grid tau**			**Error for x_4 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.497e-001$		$1.762e+001$	$2.497e-001$		$1.762e+001$
20	$5.00e-002$	$6.933e-002$	1.8	$1.762e+001$	$6.933e-002$	1.8	$1.762e+001$
40	$2.50e-002$	$1.832e-002$	1.9	$2.181e+001$	$1.832e-002$	1.9	$2.181e+001$
80	$1.25e-002$	$4.714e-003$	2.0	$2.517e+001$	$4.714e-003$	2.0	$2.517e+001$
160	$6.25e-003$	$1.196e-003$	2.0	$2.752e+001$	$1.196e-003$	2.0	$2.752e+001$
320	$3.13e-003$	$3.011e-004$	2.0	$2.901e+001$	$3.011e-004$	2.0	$2.901e+001$

Table 201: Numerical experiment `ewa450132bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	2	e	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.068e-003$		$9.132e-002$	$1.137e-003$		$1.140e-001$
20	$5.00e-002$	$2.798e-004$	1.9	$9.132e-002$	$2.841e-004$	2.0	$9.132e-002$
40	$2.50e-002$	$7.061e-005$	2.0	$1.075e-001$	$7.096e-005$	2.0	$1.075e-001$
80	$1.25e-002$	$1.769e-005$	2.0	$1.116e-001$	$1.772e-005$	2.0	$1.116e-001$
160	$6.25e-003$	$4.426e-006$	2.0	$1.128e-001$	$4.429e-006$	2.0	$1.128e-001$
320	$3.13e-003$	$1.107e-006$	2.0	$1.131e-001$	$1.107e-006$	2.0	$1.131e-001$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.969e-004$		$4.649e-002$	$6.851e-004$		$7.243e-002$
20	$5.00e-002$	$1.609e-004$	1.9	$4.649e-002$	$1.684e-004$	2.0	$4.649e-002$
40	$2.50e-002$	$4.097e-005$	2.0	$5.941e-002$	$4.168e-005$	2.0	$5.941e-002$
80	$1.25e-002$	$1.029e-005$	2.0	$6.390e-002$	$1.036e-005$	2.0	$6.390e-002$
160	$6.25e-003$	$2.576e-006$	2.0	$6.531e-002$	$2.584e-006$	2.0	$6.531e-002$
320	$3.13e-003$	$6.443e-007$	2.0	$6.582e-002$	$6.452e-007$	2.0	$6.582e-002$

Uniform Mesh		**Error for x_3 at Grid tau**			**Error for x_3 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.540e-003$		$1.041e-001$	$2.987e-003$		$1.660e-001$
20	$5.00e-002$	$4.331e-004$	1.8	$1.041e-001$	$8.911e-004$	1.7	$1.041e-001$
40	$2.50e-002$	$1.203e-004$	1.8	$1.099e-001$	$2.589e-004$	1.8	$1.099e-001$
80	$1.25e-002$	$3.308e-005$	1.9	$1.159e-001$	$7.374e-005$	1.8	$1.159e-001$
160	$6.25e-003$	$9.023e-006$	1.9	$1.221e-001$	$2.069e-005$	1.8	$1.221e-001$
320	$3.13e-003$	$2.444e-006$	1.9	$1.285e-001$	$5.737e-006$	1.9	$1.285e-001$

Uniform Mesh		**Error for x_4 at Grid tau**			**Error for x_4 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.747e-002$		$4.200e+000$	$6.747e-002$		$4.200e+000$
20	$5.00e-002$	$1.945e-002$	1.8	$4.200e+000$	$1.945e-002$	1.8	$4.200e+000$
40	$2.50e-002$	$5.486e-003$	1.8	$4.625e+000$	$5.486e-003$	1.8	$4.625e+000$
80	$1.25e-002$	$1.518e-003$	1.9	$5.122e+000$	$1.518e-003$	1.9	$5.122e+000$
160	$6.25e-003$	$4.125e-004$	1.9	$5.727e+000$	$4.125e-004$	1.9	$5.727e+000$
320	$3.13e-003$	$1.101e-004$	1.9	$6.515e+000$	$1.101e-004$	1.9	$6.515e+000$

Table 202: Numerical experiment `ewa450132bvpsuite` with $m = 2$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.242e-004$		$1.350e-001$	$1.242e-004$		$1.350e-001$
20	$5.00e-002$	$1.514e-005$	3.0	$1.350e-001$	$1.514e-005$	3.0	$1.350e-001$
40	$2.50e-002$	$1.871e-006$	3.0	$1.274e-001$	$1.871e-006$	3.0	$1.274e-001$
80	$1.25e-002$	$2.325e-007$	3.0	$1.233e-001$	$2.325e-007$	3.0	$1.233e-001$
160	$6.25e-003$	$2.899e-008$	3.0	$1.211e-001$	$2.899e-008$	3.0	$1.211e-001$
320	$3.13e-003$	$3.618e-009$	3.0	$1.199e-001$	$3.618e-009$	3.0	$1.199e-001$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.520e-004$		$1.628e-001$	$1.520e-004$		$1.628e-001$
20	$5.00e-002$	$1.861e-005$	3.0	$1.628e-001$	$1.861e-005$	3.0	$1.628e-001$
40	$2.50e-002$	$2.305e-006$	3.0	$1.551e-001$	$2.305e-006$	3.0	$1.551e-001$
80	$1.25e-002$	$2.868e-007$	3.0	$1.511e-001$	$2.868e-007$	3.0	$1.511e-001$
160	$6.25e-003$	$3.577e-008$	3.0	$1.489e-001$	$3.577e-008$	3.0	$1.489e-001$
320	$3.13e-003$	$4.466e-009$	3.0	$1.477e-001$	$4.466e-009$	3.0	$1.477e-001$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.237e-003$		$2.772e-001$	$4.237e-003$		$2.772e-001$
20	$5.00e-002$	$1.203e-003$	1.8	$2.772e-001$	$1.203e-003$	1.8	$2.772e-001$
40	$2.50e-002$	$3.370e-004$	1.8	$2.950e-001$	$3.370e-004$	1.8	$2.950e-001$
80	$1.25e-002$	$9.327e-005$	1.9	$3.137e-001$	$9.327e-005$	1.9	$3.137e-001$
160	$6.25e-003$	$2.557e-005$	1.9	$3.329e-001$	$2.557e-005$	1.9	$3.329e-001$
320	$3.13e-003$	$6.957e-006$	1.9	$3.525e-001$	$6.957e-006$	1.9	$3.525e-001$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.372e-002$		$3.437e+000$	$5.372e-002$		$3.437e+000$
20	$5.00e-002$	$1.536e-002$	1.8	$3.437e+000$	$1.536e-002$	1.8	$3.437e+000$
40	$2.50e-002$	$4.304e-003$	1.8	$3.755e+000$	$4.304e-003$	1.8	$3.755e+000$
80	$1.25e-002$	$1.184e-003$	1.9	$4.133e+000$	$1.184e-003$	1.9	$4.133e+000$
160	$6.25e-003$	$3.204e-004$	1.9	$4.600e+000$	$3.204e-004$	1.9	$4.600e+000$
320	$3.13e-003$	$8.522e-005$	1.9	$5.216e+000$	$8.522e-005$	1.9	$5.216e+000$

Table 203: Numerical experiment `ewa450132bvpsuite` with $m = 2$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.515e-006$		$2.500e-002$	$2.515e-006$		$2.500e-002$
20	$5.00e-002$	$1.574e-007$	4.0	$2.500e-002$	$1.574e-007$	4.0	$2.500e-002$
40	$2.50e-002$	$9.816e-009$	4.0	$2.546e-002$	$9.816e-009$	4.0	$2.546e-002$
80	$1.25e-002$	$6.136e-010$	4.0	$2.510e-002$	$6.136e-010$	4.0	$2.510e-002$
160	$6.25e-003$	$3.834e-011$	4.0	$2.517e-002$	$3.834e-011$	4.0	$2.517e-002$
320	$3.13e-003$	$2.400e-012$	4.0	$2.485e-002$	$2.400e-012$	4.0	$2.485e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.795e-006$		$2.890e-002$	$2.795e-006$		$2.890e-002$
20	$5.00e-002$	$1.729e-007$	4.0	$2.890e-002$	$1.729e-007$	4.0	$2.890e-002$
40	$2.50e-002$	$1.083e-008$	4.0	$2.739e-002$	$1.083e-008$	4.0	$2.739e-002$
80	$1.25e-002$	$6.765e-010$	4.0	$2.782e-002$	$6.765e-010$	4.0	$2.782e-002$
160	$6.25e-003$	$4.227e-011$	4.0	$2.776e-002$	$4.227e-011$	4.0	$2.776e-002$
320	$3.13e-003$	$2.645e-012$	4.0	$2.747e-002$	$2.645e-012$	4.0	$2.747e-002$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.733e-006$		$4.314e-002$	$4.733e-006$		$4.314e-002$
20	$5.00e-002$	$3.042e-007$	4.0	$4.314e-002$	$3.042e-007$	4.0	$4.314e-002$
40	$2.50e-002$	$1.928e-008$	4.0	$4.583e-002$	$1.928e-008$	4.0	$4.583e-002$
80	$1.25e-002$	$1.293e-009$	3.9	$3.395e-002$	$1.293e-009$	3.9	$3.395e-002$
160	$6.25e-003$	$8.718e-011$	3.9	$3.275e-002$	$8.718e-011$	3.9	$3.275e-002$
320	$3.13e-003$	$5.687e-012$	3.9	$4.177e-002$	$5.687e-012$	3.9	$4.177e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.234e-004$		$2.216e-002$	$7.234e-004$		$2.216e-002$
20	$5.00e-002$	$2.582e-004$	1.5	$2.216e-002$	$2.582e-004$	1.5	$2.216e-002$
40	$2.50e-002$	$9.046e-005$	1.5	$2.403e-002$	$9.046e-005$	1.5	$2.403e-002$
80	$1.25e-002$	$3.177e-005$	1.5	$2.371e-002$	$3.177e-005$	1.5	$2.371e-002$
160	$6.25e-003$	$1.119e-005$	1.5	$2.325e-002$	$1.119e-005$	1.5	$2.325e-002$
320	$3.13e-003$	$3.950e-006$	1.5	$2.295e-002$	$3.950e-006$	1.5	$2.295e-002$

Table 204: Numerical experiment `ewa450132bvpsuite` with $m = 3$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.692e-007$		$6.759e-003$	$5.692e-007$		$6.759e-003$
20	$5.00e-002$	$3.378e-008$	4.1	$6.759e-003$	$3.378e-008$	4.1	$6.759e-003$
40	$2.50e-002$	$2.057e-009$	4.0	$6.050e-003$	$2.057e-009$	4.0	$6.050e-003$
80	$1.25e-002$	$1.269e-010$	4.0	$5.646e-003$	$1.269e-010$	4.0	$5.646e-003$
160	$6.25e-003$	$7.879e-012$	4.0	$5.418e-003$	$7.879e-012$	4.0	$5.418e-003$
320	$3.13e-003$	$4.908e-013$	4.0	$5.289e-003$	$4.908e-013$	4.0	$5.289e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.802e-007$		$7.105e-003$	$6.590e-007$		$5.928e-003$
20	$5.00e-002$	$3.412e-008$	4.1	$7.105e-003$	$4.252e-008$	4.0	$7.105e-003$
40	$2.50e-002$	$2.067e-009$	4.0	$6.240e-003$	$2.717e-009$	4.0	$6.240e-003$
80	$1.25e-002$	$1.272e-010$	4.0	$5.750e-003$	$1.714e-010$	4.0	$5.750e-003$
160	$6.25e-003$	$7.889e-012$	4.0	$5.475e-003$	$1.076e-011$	4.0	$5.475e-003$
320	$3.13e-003$	$4.911e-013$	4.0	$5.320e-003$	$6.732e-013$	4.0	$5.320e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.590e-006$		$2.467e-002$	$2.590e-006$		$2.467e-002$
20	$5.00e-002$	$1.643e-007$	4.0	$2.467e-002$	$1.643e-007$	4.0	$2.467e-002$
40	$2.50e-002$	$1.035e-008$	4.0	$2.544e-002$	$1.035e-008$	4.0	$2.544e-002$
80	$1.25e-002$	$6.491e-010$	4.0	$2.595e-002$	$6.491e-010$	4.0	$2.595e-002$
160	$6.25e-003$	$4.065e-011$	4.0	$2.628e-002$	$4.065e-011$	4.0	$2.628e-002$
320	$3.13e-003$	$2.545e-012$	4.0	$2.633e-002$	$2.545e-012$	4.0	$2.633e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.181e-004$		$1.900e-002$	$5.181e-004$		$1.900e-002$
20	$5.00e-002$	$1.752e-004$	1.6	$1.900e-002$	$1.752e-004$	1.6	$1.900e-002$
40	$2.50e-002$	$6.043e-005$	1.5	$1.744e-002$	$6.043e-005$	1.5	$1.744e-002$
80	$1.25e-002$	$2.112e-005$	1.5	$1.624e-002$	$2.112e-005$	1.5	$1.624e-002$
160	$6.25e-003$	$7.430e-006$	1.5	$1.560e-002$	$7.430e-006$	1.5	$1.560e-002$
320	$3.13e-003$	$2.621e-006$	1.5	$1.528e-002$	$2.621e-006$	1.5	$1.528e-002$

Table 205: Numerical experiment `ewa450132bvpsuite` with $m = 3$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.627e-007$		$2.460e-003$	$2.722e-007$		$2.758e-003$
20	$5.00e-002$	$1.675e-008$	4.0	$2.460e-003$	$1.694e-008$	4.0	$2.460e-003$
40	$2.50e-002$	$1.055e-009$	4.0	$2.591e-003$	$1.058e-009$	4.0	$2.591e-003$
80	$1.25e-002$	$6.603e-011$	4.0	$2.681e-003$	$6.610e-011$	4.0	$2.681e-003$
160	$6.25e-003$	$4.139e-012$	4.0	$2.656e-003$	$4.141e-012$	4.0	$2.656e-003$
320	$3.13e-003$	$2.671e-013$	4.0	$2.144e-003$	$2.671e-013$	4.0	$2.144e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.511e-007$		$1.282e-003$	$1.641e-007$		$1.688e-003$
20	$5.00e-002$	$9.921e-009$	3.9	$1.282e-003$	$1.017e-008$	4.0	$1.282e-003$
40	$2.50e-002$	$6.260e-010$	4.0	$1.522e-003$	$6.333e-010$	4.0	$1.522e-003$
80	$1.25e-002$	$3.927e-011$	4.0	$1.572e-003$	$3.945e-011$	4.0	$1.572e-003$
160	$6.25e-003$	$2.465e-012$	4.0	$1.566e-003$	$2.468e-012$	4.0	$1.566e-003$
320	$3.13e-003$	$1.562e-013$	4.0	$1.459e-003$	$1.584e-013$	4.0	$1.459e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.945e-007$		$2.943e-003$	$5.854e-007$		$3.833e-003$
20	$5.00e-002$	$2.693e-008$	3.9	$2.943e-003$	$4.156e-008$	3.8	$2.943e-003$
40	$2.50e-002$	$1.828e-009$	3.9	$3.017e-003$	$2.895e-009$	3.8	$3.017e-003$
80	$1.25e-002$	$1.233e-010$	3.9	$3.125e-003$	$1.992e-010$	3.9	$3.125e-003$
160	$6.25e-003$	$8.296e-012$	3.9	$3.159e-003$	$1.360e-011$	3.9	$3.159e-003$
320	$3.13e-003$	$8.358e-013$	3.3	$1.649e-004$	$9.442e-013$	3.8	$1.649e-004$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.079e-004$		$1.253e-002$	$4.079e-004$		$1.253e-002$
20	$5.00e-002$	$1.455e-004$	1.5	$1.253e-002$	$1.455e-004$	1.5	$1.253e-002$
40	$2.50e-002$	$5.128e-005$	1.5	$1.319e-002$	$5.128e-005$	1.5	$1.319e-002$
80	$1.25e-002$	$1.807e-005$	1.5	$1.319e-002$	$1.807e-005$	1.5	$1.319e-002$
160	$6.25e-003$	$6.378e-006$	1.5	$1.308e-002$	$6.378e-006$	1.5	$1.308e-002$
320	$3.13e-003$	$2.253e-006$	1.5	$1.300e-002$	$2.253e-006$	1.5	$1.300e-002$

Table 206: Numerical experiment ewa450132bvpsuite with $m = 4$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	4	g	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.627e-007$		$2.460e-003$	$2.722e-007$		$2.758e-003$
20	$5.00e-002$	$1.675e-008$	4.0	$2.460e-003$	$1.694e-008$	4.0	$2.460e-003$
40	$2.50e-002$	$1.055e-009$	4.0	$2.591e-003$	$1.058e-009$	4.0	$2.591e-003$
80	$1.25e-002$	$6.603e-011$	4.0	$2.681e-003$	$6.610e-011$	4.0	$2.681e-003$
160	$6.25e-003$	$4.139e-012$	4.0	$2.656e-003$	$4.141e-012$	4.0	$2.656e-003$
320	$3.13e-003$	$2.671e-013$	4.0	$2.144e-003$	$2.671e-013$	4.0	$2.144e-003$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.511e-007$		$1.282e-003$	$1.641e-007$		$1.688e-003$
20	$5.00e-002$	$9.921e-009$	3.9	$1.282e-003$	$1.017e-008$	4.0	$1.282e-003$
40	$2.50e-002$	$6.260e-010$	4.0	$1.522e-003$	$6.333e-010$	4.0	$1.522e-003$
80	$1.25e-002$	$3.927e-011$	4.0	$1.572e-003$	$3.945e-011$	4.0	$1.572e-003$
160	$6.25e-003$	$2.465e-012$	4.0	$1.566e-003$	$2.468e-012$	4.0	$1.566e-003$
320	$3.13e-003$	$1.562e-013$	4.0	$1.459e-003$	$1.584e-013$	4.0	$1.459e-003$

Uniform Mesh		**Error for x_3 at Grid tau**			**Error for x_3 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.945e-007$		$2.943e-003$	$5.854e-007$		$3.833e-003$
20	$5.00e-002$	$2.693e-008$	3.9	$2.943e-003$	$4.156e-008$	3.8	$2.943e-003$
40	$2.50e-002$	$1.828e-009$	3.9	$3.017e-003$	$2.895e-009$	3.8	$3.017e-003$
80	$1.25e-002$	$1.233e-010$	3.9	$3.125e-003$	$1.992e-010$	3.9	$3.125e-003$
160	$6.25e-003$	$8.296e-012$	3.9	$3.159e-003$	$1.360e-011$	3.9	$3.159e-003$
320	$3.13e-003$	$8.358e-013$	3.3	$1.649e-004$	$9.442e-013$	3.8	$1.649e-004$

Uniform Mesh		**Error for x_4 at Grid tau**			**Error for x_4 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.079e-004$		$1.253e-002$	$4.079e-004$		$1.253e-002$
20	$5.00e-002$	$1.455e-004$	1.5	$1.253e-002$	$1.455e-004$	1.5	$1.253e-002$
40	$2.50e-002$	$5.128e-005$	1.5	$1.319e-002$	$5.128e-005$	1.5	$1.319e-002$
80	$1.25e-002$	$1.807e-005$	1.5	$1.319e-002$	$1.807e-005$	1.5	$1.319e-002$
160	$6.25e-003$	$6.378e-006$	1.5	$1.308e-002$	$6.378e-006$	1.5	$1.308e-002$
320	$3.13e-003$	$2.253e-006$	1.5	$1.300e-002$	$2.253e-006$	1.5	$1.300e-002$

Table 207: Numerical experiment `ewa450132bvpsuite` with $m = 4$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.009e-010$		$2.018e-004$	$2.331e-010$		$2.382e-004$
20	$5.00e-002$	$3.135e-012$	6.0	$2.018e-004$	$3.618e-012$	6.0	$2.018e-004$
40	$2.50e-002$	$6.045e-014$	5.7	$8.087e-005$	$6.511e-014$	5.8	$8.087e-005$
80	$1.25e-002$	$1.477e-014$	2.0	$1.094e-010$	$1.477e-014$	2.1	$1.094e-010$
160	$6.25e-003$	$1.554e-014$	-0.1	$1.068e-014$	$1.554e-014$	-0.1	$1.068e-014$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.398e-010$		$2.438e-004$	$2.398e-010$		$2.438e-004$
20	$5.00e-002$	$3.729e-012$	6.0	$2.438e-004$	$3.729e-012$	6.0	$2.438e-004$
40	$2.50e-002$	$7.550e-014$	5.6	$7.788e-005$	$7.550e-014$	5.6	$7.788e-005$
80	$1.25e-002$	$2.198e-014$	1.8	$5.366e-011$	$2.198e-014$	1.8	$5.366e-011$
160	$6.25e-003$	$2.576e-014$	-0.2	$8.072e-015$	$2.576e-014$	-0.2	$8.072e-015$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.612e-009$		$1.329e-004$	$1.612e-009$		$1.329e-004$
20	$5.00e-002$	$5.340e-011$	4.9	$1.329e-004$	$5.340e-011$	4.9	$1.329e-004$
40	$2.50e-002$	$1.812e-012$	4.9	$1.198e-004$	$1.812e-012$	4.9	$1.198e-004$
80	$1.25e-002$	$2.417e-013$	2.9	$8.199e-008$	$2.417e-013$	2.9	$8.199e-008$
160	$6.25e-003$	$2.077e-013$	0.2	$6.297e-013$	$2.077e-013$	0.2	$6.297e-013$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.592e-004$		$8.485e-003$	$2.592e-004$		$8.485e-003$
20	$5.00e-002$	$9.069e-005$	1.5	$8.485e-003$	$9.069e-005$	1.5	$8.485e-003$
40	$2.50e-002$	$3.190e-005$	1.5	$8.293e-003$	$3.190e-005$	1.5	$8.293e-003$
80	$1.25e-002$	$1.125e-005$	1.5	$8.180e-003$	$1.125e-005$	1.5	$8.180e-003$
160	$6.25e-003$	$3.972e-006$	1.5	$8.115e-003$	$3.972e-006$	1.5	$8.115e-003$

Table 208: Numerical experiment `ewa450132bvpsuite` with $m = 5$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa450132bvpsuite	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.147e-011$		$5.474e-005$	$5.147e-011$		$5.474e-005$
20	$5.00e-002$	$7.894e-013$	6.0	$5.474e-005$	$7.894e-013$	6.0	$5.474e-005$
40	$2.50e-002$	$1.217e-014$	6.0	$5.360e-005$	$1.217e-014$	6.0	$5.360e-005$
80	$1.25e-002$	$8.299e-015$	0.6	$9.319e-014$	$8.299e-015$	0.6	$9.319e-014$
160	$6.25e-003$	$8.521e-015$	-0.0	$7.023e-015$	$8.521e-015$	-0.0	$7.023e-015$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.277e-011$		$6.650e-005$	$6.277e-011$		$6.650e-005$
20	$5.00e-002$	$9.638e-013$	6.0	$6.650e-005$	$9.638e-013$	6.0	$6.650e-005$
40	$2.50e-002$	$1.487e-014$	6.0	$6.506e-005$	$1.487e-014$	6.0	$6.506e-005$
80	$1.25e-002$	$5.218e-015$	1.5	$3.922e-012$	$5.218e-015$	1.5	$3.922e-012$
160	$6.25e-003$	$5.662e-015$	-0.1	$3.114e-015$	$5.662e-015$	-0.1	$3.114e-015$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.004e-009$		$3.015e-004$	$3.004e-009$		$3.015e-004$
20	$5.00e-002$	$9.378e-011$	5.0	$3.015e-004$	$9.378e-011$	5.0	$3.015e-004$
40	$2.50e-002$	$2.947e-012$	5.0	$2.929e-004$	$2.947e-012$	5.0	$2.929e-004$
80	$1.25e-002$	$1.080e-013$	4.8	$1.291e-004$	$1.080e-013$	4.8	$1.291e-004$
160	$6.25e-003$	$2.021e-014$	2.4	$4.327e-009$	$2.409e-014$	2.2	$4.327e-009$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.227e-004$		$3.982e-003$	$1.227e-004$		$3.982e-003$
20	$5.00e-002$	$4.302e-005$	1.5	$3.982e-003$	$4.302e-005$	1.5	$3.982e-003$
40	$2.50e-002$	$1.515e-005$	1.5	$3.913e-003$	$1.515e-005$	1.5	$3.913e-003$
80	$1.25e-002$	$5.347e-006$	1.5	$3.872e-003$	$5.347e-006$	1.5	$3.872e-003$
160	$6.25e-003$	$1.889e-006$	1.5	$3.849e-003$	$1.889e-006$	1.5	$3.849e-003$

Table 209: Numerical experiment `ewa450132bvpsuite` with $m = 5$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	1	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.413e-002$		$1.488e+000$	$1.500e-002$		$1.442e+000$
20	$5.00e-002$	$3.479e-003$	2.0	$1.488e+000$	$3.796e-003$	2.0	$1.488e+000$
40	$2.50e-002$	$8.707e-004$	2.0	$1.385e+000$	$9.503e-004$	2.0	$1.385e+000$
80	$1.25e-002$	$2.175e-004$	2.0	$1.401e+000$	$2.375e-004$	2.0	$1.401e+000$
160	$6.25e-003$	$5.435e-005$	2.0	$1.394e+000$	$5.939e-005$	2.0	$1.394e+000$
320	$3.13e-003$	$1.359e-005$	2.0	$1.392e+000$	$1.485e-005$	2.0	$1.392e+000$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.622e-002$		$1.698e+000$	$1.622e-002$		$1.698e+000$
20	$5.00e-002$	$3.999e-003$	2.0	$1.698e+000$	$3.999e-003$	2.0	$1.698e+000$
40	$2.50e-002$	$9.964e-004$	2.0	$1.623e+000$	$9.964e-004$	2.0	$1.623e+000$
80	$1.25e-002$	$2.489e-004$	2.0	$1.602e+000$	$2.489e-004$	2.0	$1.602e+000$
160	$6.25e-003$	$6.222e-005$	2.0	$1.594e+000$	$6.222e-005$	2.0	$1.594e+000$
320	$3.13e-003$	$1.555e-005$	2.0	$1.593e+000$	$1.555e-005$	2.0	$1.593e+000$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.838e-002$		$1.647e+000$	$1.838e-002$		$1.647e+000$
20	$5.00e-002$	$4.750e-003$	2.0	$1.647e+000$	$4.750e-003$	2.0	$1.647e+000$
40	$2.50e-002$	$1.207e-003$	2.0	$1.770e+000$	$1.207e-003$	2.0	$1.770e+000$
80	$1.25e-002$	$3.043e-004$	2.0	$1.849e+000$	$3.043e-004$	2.0	$1.849e+000$
160	$6.25e-003$	$7.638e-005$	2.0	$1.898e+000$	$7.638e-005$	2.0	$1.898e+000$
320	$3.13e-003$	$1.913e-005$	2.0	$1.926e+000$	$1.913e-005$	2.0	$1.926e+000$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.456e-001$		$1.667e+001$	$2.456e-001$		$1.667e+001$
20	$5.00e-002$	$6.900e-002$	1.8	$1.667e+001$	$6.900e-002$	1.8	$1.667e+001$
40	$2.50e-002$	$1.834e-002$	1.9	$2.118e+001$	$1.834e-002$	1.9	$2.118e+001$
80	$1.25e-002$	$4.732e-003$	2.0	$2.482e+001$	$4.732e-003$	2.0	$2.482e+001$
160	$6.25e-003$	$1.202e-003$	2.0	$2.738e+001$	$1.202e-003$	2.0	$2.738e+001$
320	$3.13e-003$	$3.029e-004$	2.0	$2.901e+001$	$3.029e-004$	2.0	$2.901e+001$

Table 210: Numerical experiment `ewa4512123bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	2	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.068e-003$		$9.132e-002$	$1.137e-003$		$1.140e-001$
20	$5.00e-002$	$2.798e-004$	1.9	$9.132e-002$	$2.841e-004$	2.0	$9.132e-002$
40	$2.50e-002$	$7.061e-005$	2.0	$1.075e-001$	$7.096e-005$	2.0	$1.075e-001$
80	$1.25e-002$	$1.769e-005$	2.0	$1.116e-001$	$1.772e-005$	2.0	$1.116e-001$
160	$6.25e-003$	$4.426e-006$	2.0	$1.128e-001$	$4.429e-006$	2.0	$1.128e-001$
320	$3.13e-003$	$1.107e-006$	2.0	$1.131e-001$	$1.107e-006$	2.0	$1.131e-001$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.969e-004$		$4.649e-002$	$6.851e-004$		$7.243e-002$
20	$5.00e-002$	$1.609e-004$	1.9	$4.649e-002$	$1.684e-004$	2.0	$4.649e-002$
40	$2.50e-002$	$4.097e-005$	2.0	$5.941e-002$	$4.168e-005$	2.0	$5.941e-002$
80	$1.25e-002$	$1.029e-005$	2.0	$6.390e-002$	$1.036e-005$	2.0	$6.390e-002$
160	$6.25e-003$	$2.576e-006$	2.0	$6.531e-002$	$2.584e-006$	2.0	$6.531e-002$
320	$3.13e-003$	$6.443e-007$	2.0	$6.582e-002$	$6.452e-007$	2.0	$6.582e-002$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.275e-003$		$1.778e-001$	$2.275e-003$		$1.778e-001$
20	$5.00e-002$	$6.124e-004$	1.9	$1.778e-001$	$6.124e-004$	1.9	$1.778e-001$
40	$2.50e-002$	$1.615e-004$	1.9	$1.944e-001$	$1.615e-004$	1.9	$1.944e-001$
80	$1.25e-002$	$4.199e-005$	1.9	$2.100e-001$	$4.199e-005$	1.9	$2.100e-001$
160	$6.25e-003$	$1.080e-005$	2.0	$2.241e-001$	$1.080e-005$	2.0	$2.241e-001$
320	$3.13e-003$	$2.758e-006$	2.0	$2.368e-001$	$2.758e-006$	2.0	$2.368e-001$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.888e-002$		$3.187e+000$	$3.888e-002$		$3.187e+000$
20	$5.00e-002$	$1.032e-002$	1.9	$3.187e+000$	$1.032e-002$	1.9	$3.187e+000$
40	$2.50e-002$	$2.685e-003$	1.9	$3.475e+000$	$2.685e-003$	1.9	$3.475e+000$
80	$1.25e-002$	$6.898e-004$	2.0	$3.717e+000$	$6.898e-004$	2.0	$3.717e+000$
160	$6.25e-003$	$1.757e-004$	2.0	$3.920e+000$	$1.757e-004$	2.0	$3.920e+000$
320	$3.13e-003$	$4.451e-005$	2.0	$4.087e+000$	$4.451e-005$	2.0	$4.087e+000$

Table 211: Numerical experiment `ewa4512123bvpsuite` with $m = 2$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.242e-004$		$1.350e-001$	$1.242e-004$		$1.350e-001$
20	$5.00e-002$	$1.514e-005$	3.0	$1.350e-001$	$1.514e-005$	3.0	$1.350e-001$
40	$2.50e-002$	$1.871e-006$	3.0	$1.274e-001$	$1.871e-006$	3.0	$1.274e-001$
80	$1.25e-002$	$2.325e-007$	3.0	$1.233e-001$	$2.325e-007$	3.0	$1.233e-001$
160	$6.25e-003$	$2.899e-008$	3.0	$1.211e-001$	$2.899e-008$	3.0	$1.211e-001$
320	$3.13e-003$	$3.618e-009$	3.0	$1.199e-001$	$3.618e-009$	3.0	$1.199e-001$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.520e-004$		$1.628e-001$	$1.520e-004$		$1.628e-001$
20	$5.00e-002$	$1.861e-005$	3.0	$1.628e-001$	$1.861e-005$	3.0	$1.628e-001$
40	$2.50e-002$	$2.305e-006$	3.0	$1.551e-001$	$2.305e-006$	3.0	$1.551e-001$
80	$1.25e-002$	$2.868e-007$	3.0	$1.511e-001$	$2.868e-007$	3.0	$1.511e-001$
160	$6.25e-003$	$3.577e-008$	3.0	$1.489e-001$	$3.577e-008$	3.0	$1.489e-001$
320	$3.13e-003$	$4.466e-009$	3.0	$1.477e-001$	$4.466e-009$	3.0	$1.477e-001$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.014e-003$		$1.800e-001$	$2.014e-003$		$1.800e-001$
20	$5.00e-002$	$5.208e-004$	2.0	$1.800e-001$	$5.208e-004$	2.0	$1.800e-001$
40	$2.50e-002$	$1.332e-004$	2.0	$1.885e-001$	$1.332e-004$	2.0	$1.885e-001$
80	$1.25e-002$	$3.385e-005$	2.0	$1.958e-001$	$3.385e-005$	2.0	$1.958e-001$
160	$6.25e-003$	$8.558e-006$	2.0	$2.019e-001$	$8.558e-006$	2.0	$2.019e-001$
320	$3.13e-003$	$2.156e-006$	2.0	$2.069e-001$	$2.156e-006$	2.0	$2.069e-001$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.952e-002$		$2.454e+000$	$2.952e-002$		$2.454e+000$
20	$5.00e-002$	$7.803e-003$	1.9	$2.454e+000$	$7.803e-003$	1.9	$2.454e+000$
40	$2.50e-002$	$2.025e-003$	1.9	$2.657e+000$	$2.025e-003$	1.9	$2.657e+000$
80	$1.25e-002$	$5.193e-004$	2.0	$2.828e+000$	$5.193e-004$	2.0	$2.828e+000$
160	$6.25e-003$	$1.321e-004$	2.0	$2.973e+000$	$1.321e-004$	2.0	$2.973e+000$
320	$3.13e-003$	$3.344e-005$	2.0	$3.091e+000$	$3.344e-005$	2.0	$3.091e+000$

Table 212: Numerical experiment `ewa4512123bvpsuite` with $m = 2$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.515e-006$		$2.500e-002$	$2.515e-006$		$2.500e-002$
20	$5.00e-002$	$1.574e-007$	4.0	$2.500e-002$	$1.574e-007$	4.0	$2.500e-002$
40	$2.50e-002$	$9.816e-009$	4.0	$2.546e-002$	$9.816e-009$	4.0	$2.546e-002$
80	$1.25e-002$	$6.136e-010$	4.0	$2.510e-002$	$6.136e-010$	4.0	$2.510e-002$
160	$6.25e-003$	$3.835e-011$	4.0	$2.515e-002$	$3.835e-011$	4.0	$2.515e-002$
320	$3.13e-003$	$2.396e-012$	4.0	$2.516e-002$	$2.396e-012$	4.0	$2.516e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.795e-006$		$2.890e-002$	$2.795e-006$		$2.890e-002$
20	$5.00e-002$	$1.729e-007$	4.0	$2.890e-002$	$1.729e-007$	4.0	$2.890e-002$
40	$2.50e-002$	$1.083e-008$	4.0	$2.739e-002$	$1.083e-008$	4.0	$2.739e-002$
80	$1.25e-002$	$6.765e-010$	4.0	$2.782e-002$	$6.765e-010$	4.0	$2.782e-002$
160	$6.25e-003$	$4.227e-011$	4.0	$2.775e-002$	$4.227e-011$	4.0	$2.775e-002$
320	$3.13e-003$	$2.642e-012$	4.0	$2.770e-002$	$2.642e-012$	4.0	$2.770e-002$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.618e-006$		$4.037e-002$	$4.618e-006$		$4.037e-002$
20	$5.00e-002$	$3.005e-007$	3.9	$4.037e-002$	$3.005e-007$	3.9	$4.037e-002$
40	$2.50e-002$	$1.916e-008$	4.0	$4.410e-002$	$1.916e-008$	4.0	$4.410e-002$
80	$1.25e-002$	$1.210e-009$	4.0	$4.652e-002$	$1.210e-009$	4.0	$4.652e-002$
160	$6.25e-003$	$7.599e-011$	4.0	$4.802e-002$	$7.599e-011$	4.0	$4.802e-002$
320	$3.13e-003$	$4.757e-012$	4.0	$4.919e-002$	$4.757e-012$	4.0	$4.919e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.994e-005$		$4.220e-001$	$5.994e-005$		$4.220e-001$
20	$5.00e-002$	$4.163e-006$	3.8	$4.220e-001$	$4.163e-006$	3.8	$4.220e-001$
40	$2.50e-002$	$2.751e-007$	3.9	$5.233e-001$	$2.751e-007$	3.9	$5.233e-001$
80	$1.25e-002$	$1.770e-008$	4.0	$6.047e-001$	$1.770e-008$	4.0	$6.047e-001$
160	$6.25e-003$	$1.122e-009$	4.0	$6.614e-001$	$1.122e-009$	4.0	$6.614e-001$
320	$3.13e-003$	$7.063e-011$	4.0	$6.980e-001$	$7.063e-011$	4.0	$6.980e-001$

Table 213: Numerical experiment `ewa4512123bvpsuite` with $m = 3$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.692e-007$		$6.759e-003$	$5.692e-007$		$6.759e-003$
20	$5.00e-002$	$3.378e-008$	4.1	$6.759e-003$	$3.378e-008$	4.1	$6.759e-003$
40	$2.50e-002$	$2.057e-009$	4.0	$6.050e-003$	$2.057e-009$	4.0	$6.050e-003$
80	$1.25e-002$	$1.269e-010$	4.0	$5.646e-003$	$1.269e-010$	4.0	$5.646e-003$
160	$6.25e-003$	$7.879e-012$	4.0	$5.418e-003$	$7.879e-012$	4.0	$5.418e-003$
320	$3.13e-003$	$4.908e-013$	4.0	$5.287e-003$	$4.908e-013$	4.0	$5.287e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.802e-007$		$7.105e-003$	$6.590e-007$		$5.928e-003$
20	$5.00e-002$	$3.412e-008$	4.1	$7.105e-003$	$4.252e-008$	4.0	$7.105e-003$
40	$2.50e-002$	$2.067e-009$	4.0	$6.240e-003$	$2.717e-009$	4.0	$6.240e-003$
80	$1.25e-002$	$1.272e-010$	4.0	$5.750e-003$	$1.714e-010$	4.0	$5.750e-003$
160	$6.25e-003$	$7.889e-012$	4.0	$5.475e-003$	$1.076e-011$	4.0	$5.475e-003$
320	$3.13e-003$	$4.911e-013$	4.0	$5.319e-003$	$6.737e-013$	4.0	$5.319e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.526e-006$		$2.306e-002$	$2.526e-006$		$2.306e-002$
20	$5.00e-002$	$1.623e-007$	4.0	$2.306e-002$	$1.623e-007$	4.0	$2.306e-002$
40	$2.50e-002$	$1.028e-008$	4.0	$2.447e-002$	$1.028e-008$	4.0	$2.447e-002$
80	$1.25e-002$	$6.472e-010$	4.0	$2.538e-002$	$6.472e-010$	4.0	$2.538e-002$
160	$6.25e-003$	$4.059e-011$	4.0	$2.594e-002$	$4.059e-011$	4.0	$2.594e-002$
320	$3.13e-003$	$2.542e-012$	4.0	$2.622e-002$	$2.542e-012$	4.0	$2.622e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.775e-005$		$3.454e-001$	$3.775e-005$		$3.454e-001$
20	$5.00e-002$	$2.423e-006$	4.0	$3.454e-001$	$2.423e-006$	4.0	$3.454e-001$
40	$2.50e-002$	$1.534e-007$	4.0	$3.663e-001$	$1.534e-007$	4.0	$3.663e-001$
80	$1.25e-002$	$9.653e-009$	4.0	$3.793e-001$	$9.653e-009$	4.0	$3.793e-001$
160	$6.25e-003$	$6.053e-010$	4.0	$3.874e-001$	$6.053e-010$	4.0	$3.874e-001$
320	$3.13e-003$	$4.421e-011$	3.8	$1.268e-001$	$4.421e-011$	3.8	$1.268e-001$

Table 214: Numerical experiment `ewa4512123bvpsuite` with $m = 3$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.627e-007$		$2.460e-003$	$2.722e-007$		$2.758e-003$
20	$5.00e-002$	$1.675e-008$	4.0	$2.460e-003$	$1.694e-008$	4.0	$2.460e-003$
40	$2.50e-002$	$1.055e-009$	4.0	$2.591e-003$	$1.058e-009$	4.0	$2.591e-003$
80	$1.25e-002$	$6.603e-011$	4.0	$2.681e-003$	$6.609e-011$	4.0	$2.681e-003$
160	$6.25e-003$	$4.140e-012$	4.0	$2.652e-003$	$4.141e-012$	4.0	$2.652e-003$
320	$3.13e-003$	$2.685e-013$	3.9	$2.068e-003$	$2.685e-013$	3.9	$2.068e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.511e-007$		$1.282e-003$	$1.641e-007$		$1.688e-003$
20	$5.00e-002$	$9.921e-009$	3.9	$1.282e-003$	$1.017e-008$	4.0	$1.282e-003$
40	$2.50e-002$	$6.260e-010$	4.0	$1.522e-003$	$6.333e-010$	4.0	$1.522e-003$
80	$1.25e-002$	$3.927e-011$	4.0	$1.572e-003$	$3.945e-011$	4.0	$1.572e-003$
160	$6.25e-003$	$2.461e-012$	4.0	$1.583e-003$	$2.468e-012$	4.0	$1.583e-003$
320	$3.13e-003$	$1.614e-013$	3.9	$1.134e-003$	$1.614e-013$	3.9	$1.134e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.141e-007$		$4.379e-003$	$5.141e-007$		$4.379e-003$
20	$5.00e-002$	$3.372e-008$	3.9	$4.379e-003$	$3.372e-008$	3.9	$4.379e-003$
40	$2.50e-002$	$2.180e-009$	4.0	$4.663e-003$	$2.180e-009$	4.0	$4.663e-003$
80	$1.25e-002$	$1.396e-010$	4.0	$4.911e-003$	$1.396e-010$	4.0	$4.911e-003$
160	$6.25e-003$	$8.942e-012$	4.0	$4.890e-003$	$8.942e-012$	4.0	$4.890e-003$
320	$3.13e-003$	$8.611e-013$	3.4	$2.473e-004$	$8.611e-013$	3.4	$2.473e-004$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$8.518e-006$		$7.539e-002$	$8.518e-006$		$7.539e-002$
20	$5.00e-002$	$5.523e-007$	3.9	$7.539e-002$	$5.523e-007$	3.9	$7.539e-002$
40	$2.50e-002$	$3.537e-008$	4.0	$7.958e-002$	$3.537e-008$	4.0	$7.958e-002$
80	$1.25e-002$	$2.246e-009$	4.0	$8.311e-002$	$2.246e-009$	4.0	$8.311e-002$
160	$6.25e-003$	$1.440e-010$	4.0	$7.840e-002$	$1.440e-010$	4.0	$7.840e-002$
320	$3.13e-003$	$1.569e-011$	3.2	$1.614e-003$	$1.569e-011$	3.2	$1.614e-003$

Table 215: Numerical experiment `ewa4512123bvpsuite` with $m = 4$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.921e-009$		$7.961e-004$	$6.921e-009$		$7.961e-004$
20	$5.00e-002$	$2.074e-010$	5.1	$7.961e-004$	$2.074e-010$	5.1	$7.961e-004$
40	$2.50e-002$	$6.343e-012$	5.0	$7.280e-004$	$6.343e-012$	5.0	$7.280e-004$
80	$1.25e-002$	$1.960e-013$	5.0	$6.887e-004$	$1.960e-013$	5.0	$6.887e-004$
160	$6.25e-003$	$6.052e-015$	5.0	$6.939e-004$	$6.052e-015$	5.0	$6.939e-004$
320	$3.13e-003$	$2.998e-015$	1.0	$1.038e-012$	$2.998e-015$	1.0	$1.038e-012$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$8.233e-009$		$9.496e-004$	$8.233e-009$		$9.496e-004$
20	$5.00e-002$	$2.464e-010$	5.1	$9.496e-004$	$2.464e-010$	5.1	$9.496e-004$
40	$2.50e-002$	$7.535e-012$	5.0	$8.669e-004$	$7.535e-012$	5.0	$8.669e-004$
80	$1.25e-002$	$2.328e-013$	5.0	$8.188e-004$	$2.328e-013$	5.0	$8.188e-004$
160	$6.25e-003$	$7.212e-015$	5.0	$8.068e-004$	$7.212e-015$	5.0	$8.068e-004$
320	$3.13e-003$	$1.243e-014$	-0.8	$1.337e-016$	$1.243e-014$	-0.8	$1.337e-016$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.196e-007$		$2.135e-003$	$2.196e-007$		$2.135e-003$
20	$5.00e-002$	$1.384e-008$	4.0	$2.135e-003$	$1.384e-008$	4.0	$2.135e-003$
40	$2.50e-002$	$8.710e-010$	4.0	$2.152e-003$	$8.710e-010$	4.0	$2.152e-003$
80	$1.25e-002$	$5.469e-011$	4.0	$2.175e-003$	$5.469e-011$	4.0	$2.175e-003$
160	$6.25e-003$	$3.450e-012$	4.0	$2.114e-003$	$3.450e-012$	4.0	$2.114e-003$
320	$3.13e-003$	$2.565e-013$	3.7	$6.345e-004$	$2.565e-013$	3.7	$6.345e-004$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.253e-006$		$2.968e-002$	$3.253e-006$		$2.968e-002$
20	$5.00e-002$	$2.090e-007$	4.0	$2.968e-002$	$2.090e-007$	4.0	$2.968e-002$
40	$2.50e-002$	$1.331e-008$	4.0	$3.085e-002$	$1.331e-008$	4.0	$3.085e-002$
80	$1.25e-002$	$8.426e-010$	4.0	$3.183e-002$	$8.426e-010$	4.0	$3.183e-002$
160	$6.25e-003$	$5.343e-011$	4.0	$3.149e-002$	$5.343e-011$	4.0	$3.149e-002$
320	$3.13e-003$	$3.950e-012$	3.8	$1.024e-002$	$3.950e-012$	3.8	$1.024e-002$

Table 216: Numerical experiment `ewa4512123bvpsuite` with $m = 4$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.009e-010$		$2.024e-004$	$2.331e-010$		$2.385e-004$
20	$5.00e-002$	$3.132e-012$	6.0	$2.024e-004$	$3.616e-012$	6.0	$2.024e-004$
40	$2.50e-002$	$5.856e-014$	5.7	$9.232e-005$	$6.606e-014$	5.8	$9.232e-005$
80	$1.25e-002$	$1.651e-014$	1.8	$4.937e-011$	$1.657e-014$	2.0	$4.937e-011$
160	$6.25e-003$	$2.676e-014$	-0.7	$7.817e-016$	$2.676e-014$	-0.7	$7.817e-016$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.398e-010$		$2.432e-004$	$2.398e-010$		$2.432e-004$
20	$5.00e-002$	$3.732e-012$	6.0	$2.432e-004$	$3.732e-012$	6.0	$2.432e-004$
40	$2.50e-002$	$6.639e-014$	5.8	$1.363e-004$	$6.639e-014$	5.8	$1.363e-004$
80	$1.25e-002$	$2.798e-014$	1.2	$6.598e-012$	$2.798e-014$	1.2	$6.598e-012$
160	$6.25e-003$	$3.508e-014$	-0.3	$6.690e-015$	$3.508e-014$	-0.3	$6.690e-015$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.284e-010$		$3.951e-004$	$4.284e-010$		$3.951e-004$
20	$5.00e-002$	$6.860e-012$	6.0	$3.951e-004$	$6.860e-012$	6.0	$3.951e-004$
40	$2.50e-002$	$1.475e-013$	5.5	$1.103e-004$	$1.475e-013$	5.5	$1.103e-004$
80	$1.25e-002$	$1.966e-013$	-0.4	$3.201e-014$	$1.966e-013$	-0.4	$3.201e-014$
160	$6.25e-003$	$2.175e-013$	-0.1	$1.039e-013$	$2.175e-013$	-0.1	$1.039e-013$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.201e-009$		$3.859e-003$	$5.201e-009$		$3.859e-003$
20	$5.00e-002$	$8.890e-011$	5.9	$3.859e-003$	$8.890e-011$	5.9	$3.859e-003$
40	$2.50e-002$	$1.632e-012$	5.8	$2.835e-003$	$1.632e-012$	5.8	$2.835e-003$
80	$1.25e-002$	$1.539e-012$	0.1	$2.230e-012$	$1.539e-012$	0.1	$2.230e-012$
160	$6.25e-003$	$2.110e-012$	-0.5	$2.095e-013$	$2.110e-012$	-0.5	$2.095e-013$

Table 217: Numerical experiment `ewa4512123bvpsuite` with $m = 5$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa4512123bvpsuite	...	6	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid `tau`			Error for x_1 at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.147e-011$		$5.472e-005$	$5.147e-011$		$5.472e-005$
20	$5.00e-002$	$7.895e-013$	6.0	$5.472e-005$	$7.895e-013$	6.0	$5.472e-005$
40	$2.50e-002$	$1.220e-014$	6.0	$5.304e-005$	$1.220e-014$	6.0	$5.304e-005$
80	$1.25e-002$	$8.660e-015$	0.5	$7.550e-014$	$8.660e-015$	0.5	$7.550e-014$
160	$6.25e-003$	$9.825e-015$	-0.2	$3.897e-015$	$9.825e-015$	-0.2	$3.897e-015$

Uniform Mesh		Error for x_2 at Grid `tau`			Error for x_2 at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.277e-011$		$6.650e-005$	$6.277e-011$		$6.650e-005$
20	$5.00e-002$	$9.638e-013$	6.0	$6.650e-005$	$9.638e-013$	6.0	$6.650e-005$
40	$2.50e-002$	$1.488e-014$	6.0	$6.495e-005$	$1.488e-014$	6.0	$6.495e-005$
80	$1.25e-002$	$5.995e-015$	1.3	$1.879e-012$	$5.995e-015$	1.3	$1.879e-012$
160	$6.25e-003$	$6.328e-015$	-0.1	$4.259e-015$	$6.328e-015$	-0.1	$4.259e-015$

Uniform Mesh		Error for x_3 at Grid `tau`			Error for x_3 at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.996e-010$		$4.897e-005$	$1.996e-010$		$4.897e-005$
20	$5.00e-002$	$4.761e-012$	5.4	$4.897e-005$	$4.761e-012$	5.4	$4.897e-005$
40	$2.50e-002$	$1.104e-013$	5.4	$5.542e-005$	$1.104e-013$	5.4	$5.542e-005$
80	$1.25e-002$	$2.198e-014$	2.3	$5.915e-010$	$2.198e-014$	2.3	$5.915e-010$
160	$6.25e-003$	$3.775e-014$	-0.8	$7.204e-016$	$3.775e-014$	-0.8	$7.204e-016$

Uniform Mesh		Error for x_4 at Grid `tau`			Error for x_4 at Mesh `tcol`		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.909e-009$		$9.138e-004$	$1.909e-009$		$9.138e-004$
20	$5.00e-002$	$3.723e-011$	5.7	$9.138e-004$	$3.723e-011$	5.7	$9.138e-004$
40	$2.50e-002$	$7.677e-013$	5.6	$7.179e-004$	$7.677e-013$	5.6	$7.179e-004$
80	$1.25e-002$	$1.095e-013$	2.8	$2.438e-008$	$1.095e-013$	2.8	$2.438e-008$
160	$6.25e-003$	$2.335e-013$	-1.1	$9.115e-016$	$2.335e-013$	-1.1	$9.115e-016$

Table 218: Numerical experiment `ewa4512123bvpsuite` with $m = 5$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	1	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.056e-002$		$2.113e+000$	$2.056e-002$		$2.113e+000$
20	$5.00e-002$	$5.097e-003$	2.0	$2.113e+000$	$5.097e-003$	2.0	$2.113e+000$
40	$2.50e-002$	$1.271e-003$	2.0	$2.064e+000$	$1.271e-003$	2.0	$2.064e+000$
80	$1.25e-002$	$3.175e-004$	2.0	$2.037e+000$	$3.175e-004$	2.0	$2.037e+000$
160	$6.25e-003$	$1.145e-004$	1.5	$2.008e-001$	$1.145e-004$	1.5	$2.008e-001$
320	$3.13e-003$	$5.219e-005$	1.1	$3.601e-002$	$5.219e-005$	1.1	$3.601e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.257e-002$		$2.372e+000$	$2.257e-002$		$2.372e+000$
20	$5.00e-002$	$5.558e-003$	2.0	$2.372e+000$	$5.558e-003$	2.0	$2.372e+000$
40	$2.50e-002$	$1.386e-003$	2.0	$2.244e+000$	$1.386e-003$	2.0	$2.244e+000$
80	$1.25e-002$	$4.556e-004$	1.6	$5.176e-001$	$4.556e-004$	1.6	$5.176e-001$
160	$6.25e-003$	$1.709e-004$	1.4	$2.246e-001$	$1.709e-004$	1.4	$2.246e-001$
320	$3.13e-003$	$6.466e-005$	1.4	$2.101e-001$	$6.466e-005$	1.4	$2.101e-001$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.739e-002$		$2.018e-002$	$2.739e-002$		$2.018e-002$
20	$5.00e-002$	$3.003e-002$	-0.1	$2.018e-002$	$3.003e-002$	-0.1	$2.018e-002$
40	$2.50e-002$	$2.795e-002$	0.1	$4.090e-002$	$2.795e-002$	0.1	$4.090e-002$
80	$1.25e-002$	$2.384e-002$	0.2	$6.521e-002$	$2.384e-002$	0.2	$6.521e-002$
160	$6.25e-003$	$1.985e-002$	0.3	$7.599e-002$	$1.985e-002$	0.3	$7.599e-002$
320	$3.13e-003$	$1.646e-002$	0.3	$7.823e-002$	$1.646e-002$	0.3	$7.823e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.669e-001$		$2.518e+001$	$3.669e-001$		$2.518e+001$
20	$5.00e-002$	$1.027e-001$	1.8	$2.518e+001$	$1.027e-001$	1.8	$2.518e+001$
40	$2.50e-002$	$7.076e-002$	0.5	$5.143e-001$	$7.076e-002$	0.5	$5.143e-001$
80	$1.25e-002$	$6.523e-002$	0.1	$1.091e-001$	$6.523e-002$	0.1	$1.091e-001$
160	$6.25e-003$	$5.476e-002$	0.3	$1.973e-001$	$5.476e-002$	0.3	$1.973e-001$
320	$3.13e-003$	$4.504e-002$	0.3	$2.290e-001$	$4.504e-002$	0.3	$2.290e-001$

Table 219: Numerical experiment `ewa46321532bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	2	e	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.521e-003$		$2.307e-001$	$2.603e-003$		$2.565e-001$
20	$5.00e-002$	$6.472e-004$	2.0	$2.307e-001$	$6.538e-004$	2.0	$2.307e-001$
40	$2.50e-002$	$1.629e-004$	2.0	$2.517e-001$	$2.720e-004$	1.3	$2.517e-001$
80	$1.25e-002$	$5.353e-005$	1.6	$6.076e-002$	$1.184e-004$	1.2	$6.076e-002$
160	$6.25e-003$	$2.632e-005$	1.0	$4.765e-003$	$4.980e-005$	1.2	$4.765e-003$
320	$3.13e-003$	$1.261e-005$	1.1	$5.755e-003$	$2.079e-005$	1.3	$5.755e-003$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.328e-003$		$3.825e-002$	$2.328e-003$		$3.825e-002$
20	$5.00e-002$	$1.003e-003$	1.2	$3.825e-002$	$1.003e-003$	1.2	$3.825e-002$
40	$2.50e-002$	$3.996e-004$	1.3	$5.344e-002$	$3.996e-004$	1.3	$5.344e-002$
80	$1.25e-002$	$1.561e-004$	1.4	$5.941e-002$	$1.561e-004$	1.4	$5.941e-002$
160	$6.25e-003$	$6.088e-005$	1.4	$6.008e-002$	$6.088e-005$	1.4	$6.008e-002$
320	$3.13e-003$	$2.387e-005$	1.4	$5.776e-002$	$2.387e-005$	1.4	$5.776e-002$

Uniform Mesh		**Error for x_3 at Grid tau**			**Error for x_3 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.214e-002$		$1.454e-002$	$1.214e-002$		$1.454e-002$
20	$5.00e-002$	$1.150e-002$	0.1	$1.454e-002$	$1.150e-002$	0.1	$1.454e-002$
40	$2.50e-002$	$9.848e-003$	0.2	$2.244e-002$	$9.848e-003$	0.2	$2.244e-002$
80	$1.25e-002$	$8.206e-003$	0.3	$2.600e-002$	$8.206e-003$	0.3	$2.600e-002$
160	$6.25e-003$	$6.803e-003$	0.3	$2.685e-002$	$6.803e-003$	0.3	$2.685e-002$
320	$3.13e-003$	$5.655e-003$	0.3	$2.633e-002$	$5.655e-003$	0.3	$2.633e-002$

Uniform Mesh		**Error for x_4 at Grid tau**			**Error for x_4 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$8.132e-002$		$1.463e-002$	$8.132e-002$		$1.463e-002$
20	$5.00e-002$	$1.363e-001$	-0.7	$1.463e-002$	$1.363e-001$	-0.7	$1.463e-002$
40	$2.50e-002$	$1.300e-001$	0.1	$1.672e-001$	$1.300e-001$	0.1	$1.672e-001$
80	$1.25e-002$	$1.105e-001$	0.2	$3.086e-001$	$1.105e-001$	0.2	$3.086e-001$
160	$6.25e-003$	$9.099e-002$	0.3	$3.775e-001$	$9.099e-002$	0.3	$3.775e-001$
320	$3.13e-003$	$7.447e-002$	0.3	$3.946e-001$	$7.447e-002$	0.3	$3.946e-001$

Table 220: Numerical experiment `ewa46321532bvpsuite` with $m = 2$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.074e-004$		$7.911e-003$	$1.014e-003$		$1.799e-002$
20	$5.00e-002$	$2.220e-004$	1.2	$7.911e-003$	$4.265e-004$	1.2	$7.911e-003$
40	$2.50e-002$	$7.739e-005$	1.5	$2.108e-002$	$1.771e-004$	1.3	$2.108e-002$
80	$1.25e-002$	$2.398e-005$	1.7	$3.951e-002$	$7.350e-005$	1.3	$3.951e-002$
160	$6.25e-003$	$6.534e-006$	1.9	$8.900e-002$	$3.062e-005$	1.3	$8.900e-002$
320	$3.13e-003$	$1.915e-006$	1.8	$5.226e-002$	$1.282e-005$	1.3	$5.226e-002$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.574e-003$		$4.559e-002$	$2.574e-003$		$4.559e-002$
20	$5.00e-002$	$1.083e-003$	1.2	$4.559e-002$	$1.083e-003$	1.2	$4.559e-002$
40	$2.50e-002$	$4.339e-004$	1.3	$5.654e-002$	$4.339e-004$	1.3	$5.654e-002$
80	$1.25e-002$	$1.718e-004$	1.3	$6.008e-002$	$1.718e-004$	1.3	$6.008e-002$
160	$6.25e-003$	$6.813e-005$	1.3	$5.947e-002$	$6.813e-005$	1.3	$5.947e-002$
320	$3.13e-003$	$2.720e-005$	1.3	$5.663e-002$	$2.720e-005$	1.3	$5.663e-002$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.246e-002$		$5.526e-002$	$4.246e-002$		$5.526e-002$
20	$5.00e-002$	$3.922e-002$	0.1	$5.526e-002$	$3.922e-002$	0.1	$5.526e-002$
40	$2.50e-002$	$3.338e-002$	0.2	$7.872e-002$	$3.338e-002$	0.2	$7.872e-002$
80	$1.25e-002$	$2.778e-002$	0.3	$8.873e-002$	$2.778e-002$	0.3	$8.873e-002$
160	$6.25e-003$	$2.304e-002$	0.3	$9.067e-002$	$2.304e-002$	0.3	$9.067e-002$
320	$3.13e-003$	$1.917e-002$	0.3	$8.856e-002$	$1.917e-002$	0.3	$8.856e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.544e-001$		$9.212e-002$	$1.544e-001$		$9.212e-002$
20	$5.00e-002$	$1.804e-001$	-0.2	$9.212e-002$	$1.804e-001$	-0.2	$9.212e-002$
40	$2.50e-002$	$1.613e-001$	0.2	$2.932e-001$	$1.613e-001$	0.2	$2.932e-001$
80	$1.25e-002$	$1.346e-001$	0.3	$4.215e-001$	$1.346e-001$	0.3	$4.215e-001$
160	$6.25e-003$	$1.104e-001$	0.3	$4.722e-001$	$1.104e-001$	0.3	$4.722e-001$
320	$3.13e-003$	$9.041e-002$	0.3	$4.763e-001$	$9.041e-002$	0.3	$4.763e-001$

Table 221: Numerical experiment `ewa46321532bvpsuite` with $m = 2$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	3	e	no

Uniform Mesh		**Error for x_1 at Grid tau**			**Error for x_1 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.818e-004$		$7.560e-003$	$5.818e-004$		$7.560e-003$
20	$5.00e-002$	$2.689e-004$	1.1	$7.560e-003$	$2.689e-004$	1.1	$7.560e-003$
40	$2.50e-002$	$1.231e-004$	1.1	$7.881e-003$	$1.231e-004$	1.1	$7.881e-003$
80	$1.25e-002$	$5.581e-005$	1.1	$8.273e-003$	$5.581e-005$	1.1	$8.273e-003$
160	$6.25e-003$	$2.511e-005$	1.2	$8.702e-003$	$2.511e-005$	1.2	$8.702e-003$
320	$3.13e-003$	$1.122e-005$	1.2	$9.134e-003$	$1.122e-005$	1.2	$9.134e-003$

Uniform Mesh		**Error for x_2 at Grid tau**			**Error for x_2 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$9.676e-004$		$2.409e-002$	$9.676e-004$		$2.409e-002$
20	$5.00e-002$	$3.676e-004$	1.4	$2.409e-002$	$3.676e-004$	1.4	$2.409e-002$
40	$2.50e-002$	$1.398e-004$	1.4	$2.403e-002$	$1.398e-004$	1.4	$2.403e-002$
80	$1.25e-002$	$5.338e-005$	1.4	$2.343e-002$	$5.338e-005$	1.4	$2.343e-002$
160	$6.25e-003$	$2.055e-005$	1.4	$2.232e-002$	$2.055e-005$	1.4	$2.232e-002$
320	$3.13e-003$	$7.983e-006$	1.4	$2.085e-002$	$7.983e-006$	1.4	$2.085e-002$

Uniform Mesh		**Error for x_3 at Grid tau**			**Error for x_3 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.182e-002$		$2.297e-002$	$1.182e-002$		$2.297e-002$
20	$5.00e-002$	$9.677e-003$	0.3	$2.297e-002$	$9.677e-003$	0.3	$2.297e-002$
40	$2.50e-002$	$7.937e-003$	0.3	$2.280e-002$	$7.937e-003$	0.3	$2.280e-002$
80	$1.25e-002$	$6.544e-003$	0.3	$2.216e-002$	$6.544e-003$	0.3	$2.216e-002$
160	$6.25e-003$	$5.431e-003$	0.3	$2.127e-002$	$5.431e-003$	0.3	$2.127e-002$
320	$3.13e-003$	$4.537e-003$	0.3	$2.026e-002$	$4.537e-003$	0.3	$2.026e-002$

Uniform Mesh		**Error for x_4 at Grid tau**			**Error for x_4 at Mesh tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.580e-002$		$1.587e-001$	$7.580e-002$		$1.587e-001$
20	$5.00e-002$	$6.068e-002$	0.3	$1.587e-001$	$6.068e-002$	0.3	$1.587e-001$
40	$2.50e-002$	$4.877e-002$	0.3	$1.561e-001$	$4.877e-002$	0.3	$1.561e-001$
80	$1.25e-002$	$3.947e-002$	0.3	$1.503e-001$	$3.947e-002$	0.3	$1.503e-001$
160	$6.25e-003$	$3.221e-002$	0.3	$1.427e-001$	$3.221e-002$	0.3	$1.427e-001$
320	$3.13e-003$	$2.650e-002$	0.3	$1.343e-001$	$2.650e-002$	0.3	$1.343e-001$

Table 222: Numerical experiment `ewa46321532bvpsuite` with $m = 3$ equidistant collocation points.

bvpfile	**odeType**	**dim**	**AbsTol**	**degree**	**colpts**	**vec**
ewa46321532bvpsuite	...	4	$1e-13$	3	g	no

Uniform Mesh		**Error for x_1 at Grid `tau`**			**Error for x_1 at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.263e-004$		$1.043e-002$	$4.116e-004$		$7.797e-003$
20	$5.00e-002$	$7.145e-005$	1.7	$1.043e-002$	$1.698e-004$	1.3	$1.043e-002$
40	$2.50e-002$	$2.079e-005$	1.8	$1.483e-002$	$7.036e-005$	1.3	$1.483e-002$
80	$1.25e-002$	$5.240e-006$	2.0	$3.188e-002$	$2.932e-005$	1.3	$3.188e-002$
160	$6.25e-003$	$9.015e-007$	2.5	$3.560e-001$	$1.229e-005$	1.3	$3.560e-001$
320	$3.13e-003$	$1.011e-007$	3.2	$8.161e+000$	$5.181e-006$	1.2	$8.161e+000$

Uniform Mesh		**Error for x_2 at Grid `tau`**			**Error for x_2 at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.072e-003$		$2.413e-002$	$1.072e-003$		$2.413e-002$
20	$5.00e-002$	$4.197e-004$	1.4	$2.413e-002$	$4.197e-004$	1.4	$2.413e-002$
40	$2.50e-002$	$1.651e-004$	1.3	$2.368e-002$	$1.651e-004$	1.3	$2.368e-002$
80	$1.25e-002$	$6.540e-005$	1.3	$2.280e-002$	$6.540e-005$	1.3	$2.280e-002$
160	$6.25e-003$	$2.614e-005$	1.3	$2.155e-002$	$2.614e-005$	1.3	$2.155e-002$
320	$3.13e-003$	$1.055e-005$	1.3	$2.011e-002$	$1.055e-005$	1.3	$2.011e-002$

Uniform Mesh		**Error for x_3 at Grid `tau`**			**Error for x_3 at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.274e-002$		$6.359e-002$	$3.274e-002$		$6.359e-002$
20	$5.00e-002$	$2.681e-002$	0.3	$6.359e-002$	$2.681e-002$	0.3	$6.359e-002$
40	$2.50e-002$	$2.205e-002$	0.3	$6.245e-002$	$2.205e-002$	0.3	$6.245e-002$
80	$1.25e-002$	$1.824e-002$	0.3	$6.049e-002$	$1.824e-002$	0.3	$6.049e-002$
160	$6.25e-003$	$1.519e-002$	0.3	$5.802e-002$	$1.519e-002$	0.3	$5.802e-002$
320	$3.13e-003$	$1.273e-002$	0.3	$5.537e-002$	$1.273e-002$	0.3	$5.537e-002$

Uniform Mesh		**Error for x_4 at Grid `tau`**			**Error for x_4 at Mesh `tcol`**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.468e-001$		$3.042e-001$	$1.468e-001$		$3.042e-001$
20	$5.00e-002$	$1.179e-001$	0.3	$3.042e-001$	$1.179e-001$	0.3	$3.042e-001$
40	$2.50e-002$	$9.514e-002$	0.3	$2.981e-001$	$9.514e-002$	0.3	$2.981e-001$
80	$1.25e-002$	$7.731e-002$	0.3	$2.873e-001$	$7.731e-002$	0.3	$2.873e-001$
160	$6.25e-003$	$6.331e-002$	0.3	$2.732e-001$	$6.331e-002$	0.3	$2.732e-001$
320	$3.13e-003$	$5.227e-002$	0.3	$2.576e-001$	$5.227e-002$	0.3	$2.576e-001$

Table 223: Numerical experiment `ewa46321532bvpsuite` with $m = 3$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid `tau`			Error for x_1 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.528e-004$		$6.345e-003$	$4.528e-004$		$6.345e-003$
20	$5.00e-002$	$2.046e-004$	1.1	$6.345e-003$	$2.046e-004$	1.1	$6.345e-003$
40	$2.50e-002$	$9.185e-005$	1.2	$6.510e-003$	$9.185e-005$	1.2	$6.510e-003$
80	$1.25e-002$	$4.101e-005$	1.2	$6.711e-003$	$4.101e-005$	1.2	$6.711e-003$
160	$6.25e-003$	$1.822e-005$	1.2	$6.923e-003$	$1.822e-005$	1.2	$6.923e-003$
320	$3.13e-003$	$8.063e-006$	1.2	$7.129e-003$	$8.063e-006$	1.2	$7.129e-003$

Uniform Mesh		Error for x_2 at Grid `tau`			Error for x_2 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.176e-004$		$1.321e-002$	$5.176e-004$		$1.321e-002$
20	$5.00e-002$	$1.952e-004$	1.4	$1.321e-002$	$1.952e-004$	1.4	$1.321e-002$
40	$2.50e-002$	$7.379e-005$	1.4	$1.306e-002$	$7.379e-005$	1.4	$1.306e-002$
80	$1.25e-002$	$2.808e-005$	1.4	$1.262e-002$	$2.808e-005$	1.4	$1.262e-002$
160	$6.25e-003$	$1.078e-005$	1.4	$1.196e-002$	$1.078e-005$	1.4	$1.196e-002$
320	$3.13e-003$	$4.177e-006$	1.4	$1.113e-002$	$4.177e-006$	1.4	$1.113e-002$

Uniform Mesh		Error for x_3 at Grid `tau`			Error for x_3 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.662e-003$		$1.099e-002$	$5.662e-003$		$1.099e-002$
20	$5.00e-002$	$4.637e-003$	0.3	$1.099e-002$	$4.637e-003$	0.3	$1.099e-002$
40	$2.50e-002$	$3.815e-003$	0.3	$1.078e-002$	$3.815e-003$	0.3	$1.078e-002$
80	$1.25e-002$	$3.159e-003$	0.3	$1.041e-002$	$3.159e-003$	0.3	$1.041e-002$
160	$6.25e-003$	$2.633e-003$	0.3	$9.980e-003$	$2.633e-003$	0.3	$9.980e-003$
320	$3.13e-003$	$2.209e-003$	0.3	$9.525e-003$	$2.209e-003$	0.3	$9.525e-003$

Uniform Mesh		Error for x_4 at Grid `tau`			Error for x_4 at Mesh `tcol`		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.167e-002$		$1.080e-001$	$5.167e-002$		$1.080e-001$
20	$5.00e-002$	$4.139e-002$	0.3	$1.080e-001$	$4.139e-002$	0.3	$1.080e-001$
40	$2.50e-002$	$3.337e-002$	0.3	$1.050e-001$	$3.337e-002$	0.3	$1.050e-001$
80	$1.25e-002$	$2.712e-002$	0.3	$1.006e-001$	$2.712e-002$	0.3	$1.006e-001$
160	$6.25e-003$	$2.223e-002$	0.3	$9.533e-002$	$2.223e-002$	0.3	$9.533e-002$
320	$3.13e-003$	$1.837e-002$	0.3	$8.980e-002$	$1.837e-002$	0.3	$8.980e-002$

Table 224: Numerical experiment `ewa46321532bvpsuite` with $m = 4$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$9.998e-005$		$5.327e-003$	$2.078e-004$		$3.891e-003$
20	$5.00e-002$	$3.021e-005$	1.7	$5.327e-003$	$8.601e-005$	1.3	$5.327e-003$
40	$2.50e-002$	$8.205e-006$	1.9	$8.449e-003$	$3.580e-005$	1.3	$8.449e-003$
80	$1.25e-002$	$1.779e-006$	2.2	$2.799e-002$	$1.499e-005$	1.3	$2.799e-002$
160	$6.25e-003$	$1.330e-007$	3.7	$2.351e+001$	$6.316e-006$	1.2	$2.351e+001$
320	$3.13e-003$	$1.703e-007$	-0.4	$2.176e-008$	$2.675e-006$	1.2	$2.176e-008$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.352e-004$		$1.192e-002$	$5.352e-004$		$1.192e-002$
20	$5.00e-002$	$2.103e-004$	1.3	$1.192e-002$	$2.103e-004$	1.3	$1.192e-002$
40	$2.50e-002$	$8.320e-005$	1.3	$1.158e-002$	$8.320e-005$	1.3	$1.158e-002$
80	$1.25e-002$	$3.320e-005$	1.3	$1.105e-002$	$3.320e-005$	1.3	$1.105e-002$
160	$6.25e-003$	$1.338e-005$	1.3	$1.040e-002$	$1.338e-005$	1.3	$1.040e-002$
320	$3.13e-003$	$5.440e-006$	1.3	$9.709e-003$	$5.440e-006$	1.3	$9.709e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.626e-002$		$5.048e-002$	$2.626e-002$		$5.048e-002$
20	$5.00e-002$	$2.157e-002$	0.3	$5.048e-002$	$2.157e-002$	0.3	$5.048e-002$
40	$2.50e-002$	$1.783e-002$	0.3	$4.923e-002$	$1.783e-002$	0.3	$4.923e-002$
80	$1.25e-002$	$1.483e-002$	0.3	$4.752e-002$	$1.483e-002$	0.3	$4.752e-002$
160	$6.25e-003$	$1.241e-002$	0.3	$4.560e-002$	$1.241e-002$	0.3	$4.560e-002$
320	$3.13e-003$	$1.045e-002$	0.2	$4.365e-002$	$1.045e-002$	0.2	$4.365e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.188e-001$		$2.434e-001$	$1.188e-001$		$2.434e-001$
20	$5.00e-002$	$9.571e-002$	0.3	$2.434e-001$	$9.571e-002$	0.3	$2.434e-001$
40	$2.50e-002$	$7.763e-002$	0.3	$2.366e-001$	$7.763e-002$	0.3	$2.366e-001$
80	$1.25e-002$	$6.347e-002$	0.3	$2.268e-001$	$6.347e-002$	0.3	$2.268e-001$
160	$6.25e-003$	$5.231e-002$	0.3	$2.155e-001$	$5.231e-002$	0.3	$2.155e-001$
320	$3.13e-003$	$4.345e-002$	0.3	$2.037e-001$	$4.345e-002$	0.3	$2.037e-001$

Table 225: Numerical experiment `ewa46321532bvpsuite` with $m = 4$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.521e-004$		$5.090e-003$	$3.521e-004$		$5.090e-003$
20	$5.00e-002$	$1.576e-004$	1.2	$5.090e-003$	$1.576e-004$	1.2	$5.090e-003$
40	$2.50e-002$	$7.019e-005$	1.2	$5.196e-003$	$7.019e-005$	1.2	$5.196e-003$
80	$1.25e-002$	$3.113e-005$	1.2	$5.316e-003$	$3.113e-005$	1.2	$5.316e-003$
160	$6.25e-003$	$1.375e-005$	1.2	$5.438e-003$	$1.375e-005$	1.2	$5.438e-003$
320	$3.13e-003$	$6.060e-006$	1.2	$5.556e-003$	$6.060e-006$	1.2	$5.556e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.242e-004$		$8.401e-003$	$3.242e-004$		$8.401e-003$
20	$5.00e-002$	$1.217e-004$	1.4	$8.401e-003$	$1.217e-004$	1.4	$8.401e-003$
40	$2.50e-002$	$4.589e-005$	1.4	$8.240e-003$	$4.589e-005$	1.4	$8.240e-003$
80	$1.25e-002$	$1.743e-005$	1.4	$7.925e-003$	$1.743e-005$	1.4	$7.925e-003$
160	$6.25e-003$	$6.682e-006$	1.4	$7.487e-003$	$6.682e-006$	1.4	$7.487e-003$
320	$3.13e-003$	$2.587e-006$	1.4	$6.959e-003$	$2.587e-006$	1.4	$6.959e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$5.260e-003$		$1.017e-002$	$5.260e-003$		$1.017e-002$
20	$5.00e-002$	$4.313e-003$	0.3	$1.017e-002$	$4.313e-003$	0.3	$1.017e-002$
40	$2.50e-002$	$3.557e-003$	0.3	$9.914e-003$	$3.557e-003$	0.3	$9.914e-003$
80	$1.25e-002$	$2.954e-003$	0.3	$9.564e-003$	$2.954e-003$	0.3	$9.564e-003$
160	$6.25e-003$	$2.469e-003$	0.3	$9.169e-003$	$2.469e-003$	0.3	$9.169e-003$
320	$3.13e-003$	$2.077e-003$	0.2	$8.765e-003$	$2.077e-003$	0.2	$8.765e-003$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$3.623e-002$		$7.538e-002$	$3.623e-002$		$7.538e-002$
20	$5.00e-002$	$2.906e-002$	0.3	$7.538e-002$	$2.906e-002$	0.3	$7.538e-002$
40	$2.50e-002$	$2.351e-002$	0.3	$7.263e-002$	$2.351e-002$	0.3	$7.263e-002$
80	$1.25e-002$	$1.919e-002$	0.3	$6.928e-002$	$1.919e-002$	0.3	$6.928e-002$
160	$6.25e-003$	$1.579e-002$	0.3	$6.563e-002$	$1.579e-002$	0.3	$6.563e-002$
320	$3.13e-003$	$1.311e-002$	0.3	$6.192e-002$	$1.311e-002$	0.3	$6.192e-002$

Table 226: Numerical experiment `ewa46321532bvpsuite` with $m = 5$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46321532bvpsuite	...	4	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.086e-005$		$3.172e-003$	$1.220e-004$		$2.259e-003$
20	$5.00e-002$	$1.466e-005$	1.8	$3.172e-003$	$5.068e-005$	1.3	$3.172e-003$
40	$2.50e-002$	$3.652e-006$	2.0	$5.944e-003$	$2.118e-005$	1.3	$5.944e-003$
80	$1.25e-002$	$6.109e-007$	2.6	$4.962e-002$	$8.904e-006$	1.3	$4.962e-002$
160	$6.25e-003$	$8.283e-008$	2.9	$1.871e-001$	$3.764e-006$	1.2	$1.871e-001$
320	$3.13e-003$	$1.598e-007$	-0.9	$6.732e-010$	$1.598e-006$	1.2	$6.732e-010$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.092e-004$		$6.798e-003$	$3.092e-004$		$6.798e-003$
20	$5.00e-002$	$1.220e-004$	1.3	$6.798e-003$	$1.220e-004$	1.3	$6.798e-003$
40	$2.50e-002$	$4.851e-005$	1.3	$6.557e-003$	$4.851e-005$	1.3	$6.557e-003$
80	$1.25e-002$	$1.948e-005$	1.3	$6.238e-003$	$1.948e-005$	1.3	$6.238e-003$
160	$6.25e-003$	$7.894e-006$	1.3	$5.873e-003$	$7.894e-006$	1.3	$5.873e-003$
320	$3.13e-003$	$3.229e-006$	1.3	$5.490e-003$	$3.229e-006$	1.3	$5.490e-003$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.238e-002$		$4.254e-002$	$2.238e-002$		$4.254e-002$
20	$5.00e-002$	$1.845e-002$	0.3	$4.254e-002$	$1.845e-002$	0.3	$4.254e-002$
40	$2.50e-002$	$1.531e-002$	0.3	$4.134e-002$	$1.531e-002$	0.3	$4.134e-002$
80	$1.25e-002$	$1.279e-002$	0.3	$3.991e-002$	$1.279e-002$	0.3	$3.991e-002$
160	$6.25e-003$	$1.075e-002$	0.3	$3.837e-002$	$1.075e-002$	0.3	$3.837e-002$
320	$3.13e-003$	$9.083e-003$	0.2	$3.684e-002$	$9.083e-003$	0.2	$3.684e-002$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.004e-001$		$2.032e-001$	$1.004e-001$		$2.032e-001$
20	$5.00e-002$	$8.117e-002$	0.3	$2.032e-001$	$8.117e-002$	0.3	$2.032e-001$
40	$2.50e-002$	$6.616e-002$	0.3	$1.964e-001$	$6.616e-002$	0.3	$1.964e-001$
80	$1.25e-002$	$5.437e-002$	0.3	$1.880e-001$	$5.437e-002$	0.3	$1.880e-001$
160	$6.25e-003$	$4.504e-002$	0.3	$1.788e-001$	$4.504e-002$	0.3	$1.788e-001$
320	$3.13e-003$	$3.758e-002$	0.3	$1.695e-001$	$3.758e-002$	0.3	$1.695e-001$

Table 227: Numerical experiment `ewa46321532bvpsuite` with $m = 5$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	1	e	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.090e-002$		$4.028e+000$	$4.253e-002$		$4.316e+000$
20	$5.00e-002$	$1.027e-002$	2.0	$4.028e+000$	$1.059e-002$	2.0	$4.028e+000$
40	$2.50e-002$	$2.556e-003$	2.0	$4.194e+000$	$2.657e-003$	2.0	$4.194e+000$
80	$1.25e-002$	$6.384e-004$	2.0	$4.116e+000$	$6.649e-004$	2.0	$4.116e+000$
160	$6.25e-003$	$1.595e-004$	2.0	$4.093e+000$	$1.663e-004$	2.0	$4.093e+000$
320	$3.13e-003$	$3.989e-005$	2.0	$4.084e+000$	$4.157e-005$	2.0	$4.084e+000$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.373e-002$		$4.399e+000$	$4.373e-002$		$4.399e+000$
20	$5.00e-002$	$1.091e-002$	2.0	$4.399e+000$	$1.091e-002$	2.0	$4.399e+000$
40	$2.50e-002$	$2.716e-003$	2.0	$4.450e+000$	$2.716e-003$	2.0	$4.450e+000$
80	$1.25e-002$	$6.787e-004$	2.0	$4.361e+000$	$6.787e-004$	2.0	$4.361e+000$
160	$6.25e-003$	$1.696e-004$	2.0	$4.347e+000$	$1.696e-004$	2.0	$4.347e+000$
320	$3.13e-003$	$4.241e-005$	2.0	$4.344e+000$	$4.241e-005$	2.0	$4.344e+000$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.199e-002$		$4.416e+000$	$6.199e-002$		$4.416e+000$
20	$5.00e-002$	$1.716e-002$	1.9	$4.416e+000$	$1.716e-002$	1.9	$4.416e+000$
40	$2.50e-002$	$5.566e-003$	1.6	$2.229e+000$	$5.566e-003$	1.6	$2.229e+000$
80	$1.25e-002$	$1.886e-003$	1.6	$1.764e+000$	$1.886e-003$	1.6	$1.764e+000$
160	$6.25e-003$	$6.674e-004$	1.5	$1.344e+000$	$6.674e-004$	1.5	$1.344e+000$
320	$3.13e-003$	$2.455e-004$	1.4	$1.012e+000$	$2.455e-004$	1.4	$1.012e+000$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$7.850e-001$		$5.236e+001$	$7.850e-001$		$5.236e+001$
20	$5.00e-002$	$2.217e-001$	1.8	$5.236e+001$	$2.217e-001$	1.8	$5.236e+001$
40	$2.50e-002$	$5.908e-002$	1.9	$6.725e+001$	$5.908e-002$	1.9	$6.725e+001$
80	$1.25e-002$	$1.526e-002$	2.0	$7.938e+001$	$1.526e-002$	2.0	$7.938e+001$
160	$6.25e-003$	$3.880e-003$	2.0	$8.793e+001$	$3.880e-003$	2.0	$8.793e+001$
320	$3.13e-003$	$9.781e-004$	2.0	$9.342e+001$	$9.781e-004$	2.0	$9.342e+001$

Table 228: Numerical experiment `ewa46526552bvpsuite` with midpoint collocation $m = 1$.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	2	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.109e-003$		$6.533e-001$	$7.289e-003$		$7.120e-001$
20	$5.00e-002$	$1.823e-003$	2.0	$6.533e-001$	$1.835e-003$	2.0	$6.533e-001$
40	$2.50e-002$	$4.587e-004$	2.0	$7.097e-001$	$4.595e-004$	2.0	$7.097e-001$
80	$1.25e-002$	$1.148e-004$	2.0	$7.277e-001$	$1.149e-004$	2.0	$7.277e-001$
160	$6.25e-003$	$2.872e-005$	2.0	$7.332e-001$	$2.873e-005$	2.0	$7.332e-001$
320	$3.13e-003$	$7.181e-006$	2.0	$7.347e-001$	$7.182e-006$	2.0	$7.347e-001$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.032e-003$		$3.305e-001$	$4.416e-003$		$4.492e-001$
20	$5.00e-002$	$1.070e-003$	1.9	$3.305e-001$	$1.098e-003$	2.0	$3.305e-001$
40	$2.50e-002$	$2.707e-004$	2.0	$4.075e-001$	$2.733e-004$	2.0	$4.075e-001$
80	$1.25e-002$	$6.786e-005$	2.0	$4.266e-001$	$6.814e-005$	2.0	$4.266e-001$
160	$6.25e-003$	$1.698e-005$	2.0	$4.317e-001$	$1.701e-005$	2.0	$4.317e-001$
320	$3.13e-003$	$4.246e-006$	2.0	$4.342e-001$	$4.250e-006$	2.0	$4.342e-001$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.691e-003$		$3.289e-001$	$1.571e-002$		$7.706e-001$
20	$5.00e-002$	$2.483e-003$	1.6	$3.289e-001$	$4.865e-003$	1.7	$3.289e-001$
40	$2.50e-002$	$8.380e-004$	1.6	$2.716e-001$	$1.555e-003$	1.6	$2.716e-001$
80	$1.25e-002$	$2.954e-004$	1.5	$2.154e-001$	$5.175e-004$	1.6	$2.154e-001$
160	$6.25e-003$	$1.083e-004$	1.4	$1.679e-001$	$1.797e-004$	1.5	$1.679e-001$
320	$3.13e-003$	$4.107e-005$	1.4	$1.314e-001$	$6.495e-005$	1.5	$1.314e-001$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.273e-001$		$1.758e+001$	$3.273e-001$		$1.758e+001$
20	$5.00e-002$	$9.868e-002$	1.7	$1.758e+001$	$9.868e-002$	1.7	$1.758e+001$
40	$2.50e-002$	$3.079e-002$	1.7	$1.516e+001$	$3.079e-002$	1.7	$1.516e+001$
80	$1.25e-002$	$9.992e-003$	1.6	$1.228e+001$	$9.992e-003$	1.6	$1.228e+001$
160	$6.25e-003$	$3.380e-003$	1.6	$9.451e+000$	$3.380e-003$	1.6	$9.451e+000$
320	$3.13e-003$	$1.190e-003$	1.5	$7.046e+000$	$1.190e-003$	1.5	$7.046e+000$

Table 229: Numerical experiment `ewa46526552bvpsuite` with $m = 2$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	2	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$5.086e-004$		$2.501e-001$	$5.086e-004$		$2.501e-001$
20	$5.00e-002$	$7.871e-005$	2.7	$2.501e-001$	$7.871e-005$	2.7	$2.501e-001$
40	$2.50e-002$	$1.332e-005$	2.6	$1.702e-001$	$1.332e-005$	2.6	$1.702e-001$
80	$1.25e-002$	$2.370e-006$	2.5	$1.299e-001$	$2.370e-006$	2.5	$1.299e-001$
160	$6.25e-003$	$4.349e-007$	2.4	$1.072e-001$	$4.349e-007$	2.4	$1.072e-001$
320	$3.13e-003$	$8.141e-008$	2.4	$9.265e-002$	$8.141e-008$	2.4	$9.265e-002$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.103e-004$		$2.960e-001$	$7.103e-004$		$2.960e-001$
20	$5.00e-002$	$1.155e-004$	2.6	$2.960e-001$	$1.155e-004$	2.6	$2.960e-001$
40	$2.50e-002$	$2.036e-005$	2.5	$2.095e-001$	$2.036e-005$	2.5	$2.095e-001$
80	$1.25e-002$	$3.756e-006$	2.4	$1.644e-001$	$3.756e-006$	2.4	$1.644e-001$
160	$6.25e-003$	$7.123e-007$	2.4	$1.378e-001$	$7.123e-007$	2.4	$1.378e-001$
320	$3.13e-003$	$1.377e-007$	2.4	$1.198e-001$	$1.377e-007$	2.4	$1.198e-001$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.290e-002$		$9.597e-001$	$2.290e-002$		$9.597e-001$
20	$5.00e-002$	$7.440e-003$	1.6	$9.597e-001$	$7.440e-003$	1.6	$9.597e-001$
40	$2.50e-002$	$2.525e-003$	1.6	$7.937e-001$	$2.525e-003$	1.6	$7.937e-001$
80	$1.25e-002$	$8.947e-004$	1.5	$6.320e-001$	$8.947e-004$	1.5	$6.320e-001$
160	$6.25e-003$	$3.294e-004$	1.4	$4.954e-001$	$3.294e-004$	1.4	$4.954e-001$
320	$3.13e-003$	$1.253e-004$	1.4	$3.900e-001$	$1.253e-004$	1.4	$3.900e-001$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.630e-001$		$1.354e+001$	$2.630e-001$		$1.354e+001$
20	$5.00e-002$	$8.031e-002$	1.7	$1.354e+001$	$8.031e-002$	1.7	$1.354e+001$
40	$2.50e-002$	$2.544e-002$	1.7	$1.155e+001$	$2.544e-002$	1.7	$1.155e+001$
80	$1.25e-002$	$8.392e-003$	1.6	$9.303e+000$	$8.392e-003$	1.6	$9.303e+000$
160	$6.25e-003$	$2.885e-003$	1.5	$7.166e+000$	$2.885e-003$	1.5	$7.166e+000$
320	$3.13e-003$	$1.031e-003$	1.5	$5.393e+000$	$1.031e-003$	1.5	$5.393e+000$

Table 230: Numerical experiment `ewa46526552bvpsuite` with $m = 2$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	3	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.983e-005$		$1.896e-001$	$2.627e-005$		$5.400e-003$
20	$5.00e-002$	$1.256e-006$	4.0	$1.896e-001$	$5.288e-006$	2.3	$1.896e-001$
40	$2.50e-002$	$3.057e-007$	2.0	$5.640e-004$	$1.080e-006$	2.3	$5.640e-004$
80	$1.25e-002$	$8.309e-008$	1.9	$3.132e-004$	$2.218e-007$	2.3	$3.132e-004$
160	$6.25e-003$	$2.153e-008$	1.9	$4.241e-004$	$4.574e-008$	2.3	$4.241e-004$
320	$3.13e-003$	$5.339e-009$	2.0	$5.850e-004$	$9.488e-009$	2.3	$5.850e-004$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.192e-005$		$6.714e-003$	$4.192e-005$		$6.714e-003$
20	$5.00e-002$	$9.096e-006$	2.2	$6.714e-003$	$9.096e-006$	2.2	$6.714e-003$
40	$2.50e-002$	$1.818e-006$	2.3	$9.570e-003$	$1.818e-006$	2.3	$9.570e-003$
80	$1.25e-002$	$3.548e-007$	2.4	$1.086e-002$	$3.548e-007$	2.4	$1.086e-002$
160	$6.25e-003$	$6.899e-008$	2.4	$1.113e-002$	$6.899e-008$	2.4	$1.113e-002$
320	$3.13e-003$	$1.347e-008$	2.4	$1.078e-002$	$1.347e-008$	2.4	$1.078e-002$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.896e-004$		$1.336e-002$	$6.896e-004$		$1.336e-002$
20	$5.00e-002$	$2.826e-004$	1.3	$1.336e-002$	$2.826e-004$	1.3	$1.336e-002$
40	$2.50e-002$	$1.161e-004$	1.3	$1.319e-002$	$1.161e-004$	1.3	$1.319e-002$
80	$1.25e-002$	$4.767e-005$	1.3	$1.328e-002$	$4.767e-005$	1.3	$1.328e-002$
160	$6.25e-003$	$1.963e-005$	1.3	$1.303e-002$	$1.963e-005$	1.3	$1.303e-002$
320	$3.13e-003$	$8.125e-006$	1.3	$1.251e-002$	$8.125e-006$	1.3	$1.251e-002$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.634e-003$		$1.062e-001$	$4.634e-003$		$1.062e-001$
20	$5.00e-002$	$1.805e-003$	1.4	$1.062e-001$	$1.805e-003$	1.4	$1.062e-001$
40	$2.50e-002$	$7.249e-004$	1.3	$9.298e-002$	$7.249e-004$	1.3	$9.298e-002$
80	$1.25e-002$	$2.920e-004$	1.3	$9.167e-002$	$2.920e-004$	1.3	$9.167e-002$
160	$6.25e-003$	$1.181e-004$	1.3	$8.930e-002$	$1.181e-004$	1.3	$8.930e-002$
320	$3.13e-003$	$4.808e-005$	1.3	$8.504e-002$	$4.808e-005$	1.3	$8.504e-002$

Table 231: Numerical experiment `ewa46526552bvpsuite` with $m = 3$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	3	g	no

Uniform Mesh		Error for x_1 at Grid tau			Error for x_1 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$2.255e-005$		$3.245e-003$	$2.255e-005$		$3.245e-003$
20	$5.00e-002$	$5.052e-006$	2.2	$3.245e-003$	$5.052e-006$	2.2	$3.245e-003$
40	$2.50e-002$	$1.015e-006$	2.3	$5.204e-003$	$1.015e-006$	2.3	$5.204e-003$
80	$1.25e-002$	$1.976e-007$	2.4	$6.146e-003$	$1.976e-007$	2.4	$6.146e-003$
160	$6.25e-003$	$3.820e-008$	2.4	$6.415e-003$	$3.820e-008$	2.4	$6.415e-003$
320	$3.13e-003$	$7.409e-009$	2.4	$6.277e-003$	$7.409e-009$	2.4	$6.277e-003$

Uniform Mesh		Error for x_2 at Grid tau			Error for x_2 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$4.202e-005$		$6.557e-003$	$4.202e-005$		$6.557e-003$
20	$5.00e-002$	$9.188e-006$	2.2	$6.557e-003$	$9.188e-006$	2.2	$6.557e-003$
40	$2.50e-002$	$1.872e-006$	2.3	$8.903e-003$	$1.872e-006$	2.3	$8.903e-003$
80	$1.25e-002$	$3.745e-007$	2.3	$9.806e-003$	$3.745e-007$	2.3	$9.806e-003$
160	$6.25e-003$	$7.483e-008$	2.3	$9.872e-003$	$7.483e-008$	2.3	$9.872e-003$
320	$3.13e-003$	$1.504e-008$	2.3	$9.486e-003$	$1.504e-008$	2.3	$9.486e-003$

Uniform Mesh		Error for x_3 at Grid tau			Error for x_3 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$1.362e-003$		$2.274e-002$	$1.362e-003$		$2.274e-002$
20	$5.00e-002$	$5.834e-004$	1.2	$2.274e-002$	$5.834e-004$	1.2	$2.274e-002$
40	$2.50e-002$	$2.422e-004$	1.3	$2.607e-002$	$2.422e-004$	1.3	$2.607e-002$
80	$1.25e-002$	$9.979e-005$	1.3	$2.713e-002$	$9.979e-005$	1.3	$2.713e-002$
160	$6.25e-003$	$4.119e-005$	1.3	$2.683e-002$	$4.119e-005$	1.3	$2.683e-002$
320	$3.13e-003$	$1.709e-005$	1.3	$2.583e-002$	$1.709e-005$	1.3	$2.583e-002$

Uniform Mesh		Error for x_4 at Grid tau			Error for x_4 at Mesh tcol		
N	h	error	order	const.	error	order	const.
10	$1.00e-001$	$6.692e-003$		$1.201e-001$	$6.692e-003$		$1.201e-001$
20	$5.00e-002$	$2.806e-003$	1.3	$1.201e-001$	$2.806e-003$	1.3	$1.201e-001$
40	$2.50e-002$	$1.146e-003$	1.3	$1.346e-001$	$1.146e-003$	1.3	$1.346e-001$
80	$1.25e-002$	$4.639e-004$	1.3	$1.408e-001$	$4.639e-004$	1.3	$1.408e-001$
160	$6.25e-003$	$1.881e-004$	1.3	$1.395e-001$	$1.881e-004$	1.3	$1.395e-001$
320	$3.13e-003$	$7.673e-005$	1.3	$1.336e-001$	$7.673e-005$	1.3	$1.336e-001$

Table 232: Numerical experiment `ewa46526552bvpsuite` with $m = 3$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	4	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.758e-006$		$3.478e-004$	$9.870e-006$		$2.388e-003$
20	$5.00e-002$	$9.618e-007$	2.0	$3.478e-004$	$1.891e-006$	2.4	$3.478e-004$
40	$2.50e-002$	$2.370e-007$	2.0	$4.093e-004$	$3.841e-007$	2.3	$4.093e-004$
80	$1.25e-002$	$5.683e-008$	2.1	$4.736e-004$	$7.906e-008$	2.3	$4.736e-004$
160	$6.25e-003$	$1.333e-008$	2.1	$5.437e-004$	$1.638e-008$	2.3	$5.437e-004$
320	$3.13e-003$	$3.076e-009$	2.1	$6.151e-004$	$3.414e-009$	2.3	$6.151e-004$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.532e-005$		$3.696e-003$	$1.532e-005$		$3.696e-003$
20	$5.00e-002$	$2.937e-006$	2.4	$3.696e-003$	$2.937e-006$	2.4	$3.696e-003$
40	$2.50e-002$	$5.625e-007$	2.4	$3.713e-003$	$5.625e-007$	2.4	$3.713e-003$
80	$1.25e-002$	$1.081e-007$	2.4	$3.659e-003$	$1.081e-007$	2.4	$3.659e-003$
160	$6.25e-003$	$2.089e-008$	2.4	$3.510e-003$	$2.089e-008$	2.4	$3.510e-003$
320	$3.13e-003$	$4.075e-009$	2.4	$3.291e-003$	$4.075e-009$	2.4	$3.291e-003$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.014e-004$		$4.048e-003$	$2.014e-004$		$4.048e-003$
20	$5.00e-002$	$8.163e-005$	1.3	$4.048e-003$	$8.163e-005$	1.3	$4.048e-003$
40	$2.50e-002$	$3.335e-005$	1.3	$3.909e-003$	$3.335e-005$	1.3	$3.909e-003$
80	$1.25e-002$	$1.370e-005$	1.3	$3.799e-003$	$1.370e-005$	1.3	$3.799e-003$
160	$6.25e-003$	$5.662e-006$	1.3	$3.650e-003$	$5.662e-006$	1.3	$3.650e-003$
320	$3.13e-003$	$2.356e-006$	1.3	$3.475e-003$	$2.356e-006$	1.3	$3.475e-003$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.152e-003$		$5.028e-002$	$2.152e-003$		$5.028e-002$
20	$5.00e-002$	$8.333e-004$	1.4	$5.028e-002$	$8.333e-004$	1.4	$5.028e-002$
40	$2.50e-002$	$3.324e-004$	1.3	$4.421e-002$	$3.324e-004$	1.3	$4.421e-002$
80	$1.25e-002$	$1.339e-004$	1.3	$4.211e-002$	$1.339e-004$	1.3	$4.211e-002$
160	$6.25e-003$	$5.430e-005$	1.3	$4.014e-002$	$5.430e-005$	1.3	$4.014e-002$
320	$3.13e-003$	$2.221e-005$	1.3	$3.786e-002$	$2.221e-005$	1.3	$3.786e-002$

Table 233: Numerical experiment `ewa46526552bvpsuite` with $m = 4$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	4	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$7.179e-006$		$1.725e-003$	$7.179e-006$		$1.725e-003$
20	$5.00e-002$	$1.378e-006$	2.4	$1.725e-003$	$1.378e-006$	2.4	$1.725e-003$
40	$2.50e-002$	$2.644e-007$	2.4	$1.732e-003$	$2.644e-007$	2.4	$1.732e-003$
80	$1.25e-002$	$5.087e-008$	2.4	$1.706e-003$	$5.087e-008$	2.4	$1.706e-003$
160	$6.25e-003$	$9.852e-009$	2.4	$1.635e-003$	$9.852e-009$	2.4	$1.635e-003$
320	$3.13e-003$	$1.925e-009$	2.4	$1.532e-003$	$1.925e-009$	2.4	$1.532e-003$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.279e-005$		$2.794e-003$	$1.279e-005$		$2.794e-003$
20	$5.00e-002$	$2.527e-006$	2.3	$2.794e-003$	$2.527e-006$	2.3	$2.794e-003$
40	$2.50e-002$	$5.005e-007$	2.3	$2.763e-003$	$5.005e-007$	2.3	$2.763e-003$
80	$1.25e-002$	$9.971e-008$	2.3	$2.682e-003$	$9.971e-008$	2.3	$2.682e-003$
160	$6.25e-003$	$2.002e-008$	2.3	$2.551e-003$	$2.002e-008$	2.3	$2.551e-003$
320	$3.13e-003$	$4.056e-009$	2.3	$2.390e-003$	$4.056e-009$	2.3	$2.390e-003$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.217e-004$		$1.227e-002$	$6.217e-004$		$1.227e-002$
20	$5.00e-002$	$2.534e-004$	1.3	$1.227e-002$	$2.534e-004$	1.3	$1.227e-002$
40	$2.50e-002$	$1.038e-004$	1.3	$1.198e-002$	$1.038e-004$	1.3	$1.198e-002$
80	$1.25e-002$	$4.278e-005$	1.3	$1.163e-002$	$4.278e-005$	1.3	$1.163e-002$
160	$6.25e-003$	$1.774e-005$	1.3	$1.116e-002$	$1.774e-005$	1.3	$1.116e-002$
320	$3.13e-003$	$7.407e-006$	1.3	$1.063e-002$	$7.407e-006$	1.3	$1.063e-002$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.216e-003$		$6.873e-002$	$3.216e-003$		$6.873e-002$
20	$5.00e-002$	$1.279e-003$	1.3	$6.873e-002$	$1.279e-003$	1.3	$6.873e-002$
40	$2.50e-002$	$5.140e-004$	1.3	$6.589e-002$	$5.140e-004$	1.3	$6.589e-002$
80	$1.25e-002$	$2.078e-004$	1.3	$6.362e-002$	$2.078e-004$	1.3	$6.362e-002$
160	$6.25e-003$	$8.468e-005$	1.3	$6.067e-002$	$8.468e-005$	1.3	$6.067e-002$
320	$3.13e-003$	$3.478e-005$	1.3	$5.721e-002$	$3.478e-005$	1.3	$5.721e-002$

Table 234: Numerical experiment `ewa46526552bvpsuite` with $m = 4$ Gaussian collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	5	e	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.727e-006$		$3.207e-004$	$2.863e-006$		$3.953e-004$
20	$5.00e-002$	$6.494e-007$	2.1	$3.207e-004$	$6.494e-007$	2.1	$3.207e-004$
40	$2.50e-002$	$1.522e-007$	2.1	$3.436e-004$	$1.522e-007$	2.1	$3.436e-004$
80	$1.25e-002$	$3.513e-008$	2.1	$3.723e-004$	$3.513e-008$	2.1	$3.723e-004$
160	$6.25e-003$	$8.009e-009$	2.1	$4.027e-004$	$8.009e-009$	2.1	$4.027e-004$
320	$3.13e-003$	$1.808e-009$	2.1	$4.328e-004$	$1.808e-009$	2.1	$4.328e-004$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$6.510e-006$		$1.599e-003$	$6.510e-006$		$1.599e-003$
20	$5.00e-002$	$1.242e-006$	2.4	$1.599e-003$	$1.242e-006$	2.4	$1.599e-003$
40	$2.50e-002$	$2.368e-007$	2.4	$1.602e-003$	$2.368e-007$	2.4	$1.602e-003$
80	$1.25e-002$	$4.538e-008$	2.4	$1.558e-003$	$4.538e-008$	2.4	$1.558e-003$
160	$6.25e-003$	$8.768e-009$	2.4	$1.480e-003$	$8.768e-009$	2.4	$1.480e-003$
320	$3.13e-003$	$1.711e-009$	2.4	$1.380e-003$	$1.711e-009$	2.4	$1.380e-003$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.313e-004$		$2.567e-003$	$1.313e-004$		$2.567e-003$
20	$5.00e-002$	$5.364e-005$	1.3	$2.567e-003$	$5.364e-005$	1.3	$2.567e-003$
40	$2.50e-002$	$2.198e-005$	1.3	$2.536e-003$	$2.198e-005$	1.3	$2.536e-003$
80	$1.25e-002$	$9.059e-006$	1.3	$2.459e-003$	$9.059e-006$	1.3	$2.459e-003$
160	$6.25e-003$	$3.759e-006$	1.3	$2.355e-003$	$3.759e-006$	1.3	$2.355e-003$
320	$3.13e-003$	$1.570e-006$	1.3	$2.242e-003$	$1.570e-006$	1.3	$2.242e-003$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$9.373e-004$		$1.964e-002$	$9.373e-004$		$1.964e-002$
20	$5.00e-002$	$3.751e-004$	1.3	$1.964e-002$	$3.751e-004$	1.3	$1.964e-002$
40	$2.50e-002$	$1.507e-004$	1.3	$1.930e-002$	$1.507e-004$	1.3	$1.930e-002$
80	$1.25e-002$	$6.099e-005$	1.3	$1.858e-002$	$6.099e-005$	1.3	$1.858e-002$
160	$6.25e-003$	$2.489e-005$	1.3	$1.764e-002$	$2.489e-005$	1.3	$1.764e-002$
320	$3.13e-003$	$1.024e-005$	1.3	$1.660e-002$	$1.024e-005$	1.3	$1.660e-002$

Table 235: Numerical experiment `ewa46526552bvpsuite` with $m = 5$ equidistant collocation points.

bvpfile	odeType	dim	AbsTol	degree	colpts	vec
ewa46526552bvpsuite	...	4	$1e-13$	5	g	no

Uniform Mesh		Error for x_1 at Grid **tau**			Error for x_1 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$2.548e-006$		$6.142e-004$	$2.548e-006$		$6.142e-004$
20	$5.00e-002$	$4.887e-007$	2.4	$6.142e-004$	$4.887e-007$	2.4	$6.142e-004$
40	$2.50e-002$	$9.385e-008$	2.4	$6.112e-004$	$9.385e-008$	2.4	$6.112e-004$
80	$1.25e-002$	$1.813e-008$	2.4	$5.917e-004$	$1.813e-008$	2.4	$5.917e-004$
160	$6.25e-003$	$3.534e-009$	2.4	$5.602e-004$	$3.534e-009$	2.4	$5.602e-004$
320	$3.13e-003$	$6.955e-010$	2.3	$5.212e-004$	$6.955e-010$	2.3	$5.212e-004$

Uniform Mesh		Error for x_2 at Grid **tau**			Error for x_2 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$4.636e-006$		$1.008e-003$	$4.636e-006$		$1.008e-003$
20	$5.00e-002$	$9.175e-007$	2.3	$1.008e-003$	$9.175e-007$	2.3	$1.008e-003$
40	$2.50e-002$	$1.824e-007$	2.3	$9.885e-004$	$1.824e-007$	2.3	$9.885e-004$
80	$1.25e-002$	$3.654e-008$	2.3	$9.491e-004$	$3.654e-008$	2.3	$9.491e-004$
160	$6.25e-003$	$7.384e-009$	2.3	$8.973e-004$	$7.384e-009$	2.3	$8.973e-004$
320	$3.13e-003$	$1.506e-009$	2.3	$8.398e-004$	$1.506e-009$	2.3	$8.398e-004$

Uniform Mesh		Error for x_3 at Grid **tau**			Error for x_3 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$3.261e-004$		$6.335e-003$	$3.261e-004$		$6.335e-003$
20	$5.00e-002$	$1.335e-004$	1.3	$6.335e-003$	$1.335e-004$	1.3	$6.335e-003$
40	$2.50e-002$	$5.493e-005$	1.3	$6.206e-003$	$5.493e-005$	1.3	$6.206e-003$
80	$1.25e-002$	$2.274e-005$	1.3	$5.996e-003$	$2.274e-005$	1.3	$5.996e-003$
160	$6.25e-003$	$9.480e-006$	1.3	$5.746e-003$	$9.480e-006$	1.3	$5.746e-003$
320	$3.13e-003$	$3.977e-006$	1.3	$5.484e-003$	$3.977e-006$	1.3	$5.484e-003$

Uniform Mesh		Error for x_4 at Grid **tau**			Error for x_4 at Mesh **tcol**		
N	**h**	**error**	**order**	**const.**	**error**	**order**	**const.**
10	$1.00e-001$	$1.650e-003$		$3.411e-002$	$1.650e-003$		$3.411e-002$
20	$5.00e-002$	$6.628e-004$	1.3	$3.411e-002$	$6.628e-004$	1.3	$3.411e-002$
40	$2.50e-002$	$2.675e-004$	1.3	$3.342e-002$	$2.675e-004$	1.3	$3.342e-002$
80	$1.25e-002$	$1.088e-004$	1.3	$3.215e-002$	$1.088e-004$	1.3	$3.215e-002$
160	$6.25e-003$	$4.460e-005$	1.3	$3.054e-002$	$4.460e-005$	1.3	$3.054e-002$
320	$3.13e-003$	$1.843e-005$	1.3	$2.880e-002$	$1.843e-005$	1.3	$2.880e-002$

Table 236: Numerical experiment `ewa46526552bvpsuite` with $m = 5$ Gaussian collocation points.

A Example files

```
function out = ewa011(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 0];

  case 'df/dy'
    out = - [ cos(t) 0 ; 0 exp(t) ];

  case 'f'
    out = [ cos(t)^2 - sin(t) ; -exp(2*t) ];

  case 'R'
    out = [ ya(1) - 1 ; cos(1)*yb(1)-exp(1)*yb(2)+sin(1)-cos(1)^2-exp(2) ];
    % x1(0) = 1
    % cos(1)*x1(2) - exp(1)*x2(1) = cos(1)^2 + exp(2) - sin(1)

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; cos(1) -exp(1) ];

  case 'solution'
    out = [ cos(t) ; exp(-t) .* (sin(t) - exp(2*t)) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa021(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 -1];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [t^2-1 , 0 ; 0 , t^2];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [1;1] * (sinh(t) + (t^2-1) * t^2 * cosh(t));

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1)+ya(2)+1 ; yb(2) ];
    % x1(0) + x2(0) = -1
    % x2(1) = 0

  case 'dR/dya'
    out = [ 1 1 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 0 1 ];

  case 'solution'
    out = [t.^2 .* cosh(t) ; (t.^2-1) .* cosh(t)];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa0311(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 sin(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = [ 0 cos(t) ; 0 cos(t)-exp(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ 1 ; ( t^4*exp(t)*(5*log(t)+1) +cos(t) -exp(t) ) / cos(t) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ya(1)+yb(2) ; yb(2) ];
    % x1(0) + x2(1) = 0
    % x2(1) = 0

  case 'dR/dya'
    out = [1 0 ; 0 0];

  case 'dR/dyb'
    out = [0 1 ; 0 1];

  case 'solution'
    log_t = zeros(1,length(t));
    for j = 1:length(t)
      if t(j)~=0
            log_t(j) = log(t(j));
      end
    end
    tmp = ( -t.^4.*exp(t).*(5*log_t+1) + exp(t) ) ./ cos(t) ./ exp(t);
    out = [ t.^5.*log_t + sin(t).* tmp ; -tmp ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa0312(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 sin(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = [ 0 cos(t) ; 0 cos(t)-exp(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ 1 ; ( t^4*exp(t)*(5*log(t)+1) +cos(t) -exp(t) ) / cos(t) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ya(1) ; yb(2) ];
    % x1(0) = 0
    % x2(1) = 0

  case 'dR/dya'
    out = [1 0 ; 0 0];

  case 'dR/dyb'
    out = [0 0 ; 0 1];

  case 'solution'
    log_t = zeros(1,length(t));
    for j = 1:length(t)
      if t(j)~=0
            log_t(j) = log(t(j));
      end
    end
    tmp = ( -t.^4.*exp(t).*(5*log_t+1) + exp(t) ) ./ cos(t) ./ exp(t);
    out = [ t.^5.*log_t + sin(t).* tmp ; -tmp ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa0313(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 sin(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = [ 0 cos(t) ; 0 cos(t)-exp(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ 1 ; ( t^4*exp(t)*(5*log(t)+1) +cos(t) -exp(t) ) / cos(t) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ya(1)+ya(2)+1 ; yb(2) ];
    % x1(0) + x2(0) = -1
    % x2(1) = 0

  case 'dR/dya'
    out = [1 1 ; 0 0];

  case 'dR/dyb'
    out = [0 0 ; 0 1];

  case 'solution'
    log_t = zeros(1,length(t));
    for j=1:length(t)
      if t(j)~=0
            log_t(j) = log(t(j));
      end
    end
    tmp = ( -t.^4.*exp(t).*(5*log_t+1) + exp(t) ) ./ cos(t) ./ exp(t);
    out = [ t.^5.*log_t + sin(t).* tmp ; -tmp ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa0411(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 cos(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ cosh(t) sin(t) ; 0 sin(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [1;1] * (10*cos(10*t)+tan(t)*sin(10*t));

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [yb(2)-sin(10)/cos(1) ; ya(1) ];
    % x2(1) = sin(10)/cos(1)
    % x1(0) = 0

  case 'dR/dya'
    out = [0 0 ; 1 0];

  case 'dR/dyb'
    out = [0 1 ; 0 0];

  case 'solution' % Exakte Loesung der DAE
    out = [ zeros(1,length(t)) ; sin(10*t)./cos(t) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = ewa0412(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 cos(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ cosh(t) sin(t) ; 0 sin(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [cos(t)*cosh(t)-sin(t) ; -sin(t)];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1)-1 ; yb(2) ];
    % x1(0) = 1
    % x2(1) = 0

  case 'dR/dya'
    out = [1 0 ; 0 0];

  case 'dR/dyb'
    out = [0 0 ; 0 1];

  case 'solution'
    out = [ cos(t) ; zeros(1,length(t)) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = ewa0413(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 cos(t)];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ cosh(t) sin(t) ; 0 sin(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ -cos(t)^2*cosh(t) ; 0 ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1)+1 ; yb(2)-2*cos(1) ];
    % x1(0) = -1
    % x2(1) = 2*cos(1)

  case 'dR/dya'
    out = [1 0 ; 0 0];

  case 'dR/dyb'
    out = [0 0 ; 0 1];

  case 'solution'
    out = [-cos(t).^2 ; 2*cos(t)];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = ewa111(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 0];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ 1/t 0 ; 0 cos(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ 2*sin(t)+t*cos(t) ; -exp(2*t) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1) ; cos(1)*yb(2)-yb(1)+2*sin(1)+cos(1)+exp(2) ];
    % x1(0) = 0
    % cos(1)*x2(1) - x1(1) = -2*sin(1) - cos(1) - exp(2)

  case 'dR/dya'
    out = [ 1 0 ; 0 0];

  case 'dR/dyb'
    out = [ 0 0 ; -1 cos(1) ];

  case 'solution'
    out = [t.*sin(t) ; -(sin(t)+t.*cos(t)+exp(2*t))./cos(t)];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa121(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 -1];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [ t 0 ; 0 sin(t) ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [1 ; 1] * ( 1-cos(t)-t*sin(t) );

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [yb(1)-yb(2)+sin(1)-1 ; yb(2)+1];
    % x1(1) - x2(1) = 1 - sin(1)
    % x2(1) = -1

  case 'dR/dya'
    out = [0 0 ; 0 0];

  case 'dR/dyb'
    out = [1 -1 ; 0 1 ];

  case 'solution'
     out = -[sin(t);t];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa122(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 -1];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ 2 0 ; 0 t+2 ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ -t.*exp(5*t) ; -(8*t+7)/2.*t.*exp(5*t)];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1)-ya(2) ; 2*yb(1)-3*yb(2)-6.5*exp(5)];
    % x1(0) - x2(0) = 0
    % 2*x1(1) - 3*x2(1) = 6.5*exp(5)

  case 'dR/dya'
    out = [ 1 -1 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 2 -3 ];

  case 'solution'
    out = [ -(6*t+1)/2.*exp(5*t) ; -(8*t+1)/2.*exp(5*t) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa131(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 t^2];

  case 'daeR'
    out = [0 1];
    % zusaetzliche Randbedingung wird rechts gestellt

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [ 1/t -2*t ; 0 -2*t ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ -sin(t)/2 ; 2/3/t*(cos(t)-1) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ yb(1)+yb(2)-2+cos(1) ; yb(1)+sin(1)/2+2/3*(cos(1)-1) ];
    % x1(1) + x2(1) = 2-cos(1)
    % x1(1) = -sin(1)/2 - 2/3*( cos(1) - 1 )

  case 'dR/dya'
    out = [ 0 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 1 1 ; 1 0 ];

  case 'solution'

    warning off; % Division by zero
    tmp = (t.^2-cos(t)+1)./t.^2+sin(t)./t/2+2/3*t.^(-2).*(cos(t)-1);
    warning on;
    if t(1) == 0
      tmp(1) = 5/3; % this is the limit for x \to 0
    end
    out = [ -(t.*sin(t)/2 + 2/3*(cos(t)-1)) ; tmp ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
% - zusaetzliche (konsistente) Randbedingung muss rechts gestellt werden statt links
```

```
function out = ewa141(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 t];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [ 1 -1 ; 0 -2*t-1 ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ -sin(t) ; -(t*cos(t)+2*(2*t+1)*sin(t))/(t+1) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1) ; yb(1)+2*yb(2)-(cos(1)+4*sin(1))/2 ];
    % x1(0) = 0
    % x1(1) + 2*x2(1) = ( cos(1) + 4*sin(1) )/2

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 2 ];

  case 'solution'

    g2g1=-(t.*cos(t)+2*(2*t+1).*sin(t))./(t+1)+sin(t);
    warning off
    out = [ 2*sin(t)+g2g1 ; -(sin(t)+g2g1)./t ];
    warning on;
    out(2,1) = 0;

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = ewa142(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 t];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [ 1 -1 ; 0 -2*t-1 ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ exp(t) ; -(t*exp(t)-2*t-1)/(t+1) ];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1) ; yb(1)+2*yb(2)-3*(exp(1)-1)/2 ];
    % x1(0) = 0
    % x1(1) + 2*x2(1) = 3*( exp(1) - 1 )/2

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 2 ];

  case 'solution'

    g2g1=-(t.*exp(t)-2*t-1)./(t+1)-exp(t);
    warning off
    out = [2*(exp(t)-1)+g2g1 ; -(exp(t)-1+g2g1)./t];
    warning on
    out(2,1) = 0;

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

```
function out = lin41(flag,t,x,xa,xb,varargin)

%*** Example 4.1 with free parameter m
m = 1; %*** = Example 4.11

B11 = [-11 -18 ; 12 19];
B12 = [3 -1 ; -2 1];
B21 = [1 1 ; 2 3];
B22 = [1 0 ; 0 1/5];

switch flag

    case 'tau'
        out = [0,1];

    case 'daeA'
        out = [t*eye(2) ; zeros(2,2)];

    case 'daeD'
        out = [eye(2) zeros(2,2)];

    case 'daeR'
        out = [0 1];

    case 'df/dy'
        out = -[B11 B12 ; B21 B22];

    case 'f'
        out = [g1(m,t);g2(m,t)];

    case 'R'
        out = [ ...
                2*xa(1)+3*xa(2) ; ...
                xb(1)+xb(2)-exp(m)*sin(1)-cos(m)+1.5 ; ...
                [B21 B22]*xa-g2(m,0) ...
              ];

    case 'dR/dya'
        out = [ ...
                2 3 0 0 ; ...
                0 0 0 0 ; ...
                B21 B22 ...
              ];

    case 'dR/dyb'
        out = [ ...
                0 0 0 0 ; ...
                1 1 0 0 ; ...
                0 0 0 0 ; ...
                0 0 0 0 ...
              ];

    case 'solution'
        out = [ ...
                exp(m*t).*sin(t)-1.5 ; ...
                cos(m*t) ; ...
                cos(m*t)-1 ; ...
                exp(m*t).*sin(t) ...
              ];

    otherwise
        error(['+++ Unknown flag : ',flag,' +++']);

end

%----------

function out = g1(m,t)
out = [ ...
        t*exp(m*t)*(m*sin(t)+cos(t))-12*exp(m*t)*sin(t)-15*cos(m*t)+13.5 ; ...
        -m*t*sin(m*t)+13*exp(m*t)*sin(t)+17*cos(m*t)-16 ...
```

```
      ];

function out = g2(m,t)
out = [ ...
        exp(m*t)*sin(t)+2*cos(m*t)-2.5 ; ...
        2.2*exp(m*t)*sin(t)+3*cos(m*t)-3 ...
      ];
```

```
function out = lin42(flag,t,x,xa,xb,varargin)

%*** Example 4.2 with free parameter m
m = 5; %*** = Example 4.25

B11 = [9 12 ; -8 -11];
B12 = [3 -1 ; -2 1];
B21 = [1 1 ; 2 3];
B22 = [1 0 ; 0 1/2];

switch flag

    case 'tau'
        out = [0,1];

    case 'daeA'
        out = [t*eye(2) ; zeros(2,2)];

    case 'daeD'
        out = [eye(2) zeros(2,2)];

    case 'df/dy'
        out = -[B11 B12 ; B21 B22];

    case 'f'
        out = [g1(m,t);g2(m,t)];

    case 'R'
        out = [ ...
                2*xb(1)+3*xb(2)-2*exp(m)*sin(1)-3*cos(m)+4 ; ...
                xa(1)+xa(2)+0.5 ; ...
                [B21 B22]*xa-g2(m,0) ...
              ];

    case 'dR/dya'
        out = [ ...
                0 0 0 0 ; ...
                1 1 0 0 ; ...
                B21 B22 ...
              ];

    case 'dR/dyb'
        out = [ ...
                2 3 0 0 ; ...
                0 0 0 0 ; ...
                0 0 0 0 ; ...
                0 0 0 0 ...
              ];

    case 'solution'
        out = [ ...
                exp(m*t).*sin(t)-1.5+t.^5 ; ...
                cos(m*t)-t.^5 ; ...
                cos(m*t)-1 ; ...
                exp(m*t).*sin(t) ...
              ];

    otherwise
        error(['+++ Unknown flag : ',flag,' +++']);

end

%----------

function out = g1(m,t)
out = [ ...
        t*exp(m*t)*(m*sin(t)+cos(t))+8*exp(m*t)*sin(t)+15*cos(m*t)+2*t^5-16.5 ; ...
        -m*t*sin(m*t)-7*exp(m*t)*sin(t)-13*cos(m*t)-2*t^5+14 ...
      ];

function out = g2(m,t)
```

```
out = [ ...
        exp(m*t)*sin(t)+2*cos(m*t)-2.5 ; ...
        2.5*exp(m*t)*sin(t)+3*cos(m*t)-3-t^5 ...
      ];
```

```
function out = lin43(flag,t,x,xa,xb,varargin)

%*** Example 4.3 with free parameter m
m = 4; %*** = Example 4.34

B11 = [-9 -15 ; 8 13];
B12 = [3 -1 ; -2 1];
B21 = [1 1 ; 2 3];
B22 = [1 0 ; 0 1/3];

switch flag

    case ’tau’
        out = [0,1];

    case ’daeA’
        out = [t*eye(2) ; zeros(2,2)];

    case ’daeD’
        out = [eye(2) zeros(2,2)];

    case ’df/dy’
        out = -[B11 B12 ; B21 B22];

    case ’f’
        out = [g1(m,t);g2(m,t)];

    case ’R’
        out = [ ...
                2*xa(1)+3*xa(2) ; ...
                xb(1)+xb(2)-exp(m)*sin(1)-cos(m)+2 ; ...
                [B21 B22]*xa-g2(m,0) ...
              ];

    case ’dR/dya’
        out = [ ...
                2 3 0 0 ; ...
                0 0 0 0 ; ...
                B21 B22 ...
              ];

    case ’dR/dyb’
        out = [ ...
                0 0 0 0 ; ...
                1 1 0 0 ; ...
                0 0 0 0 ; ...
                0 0 0 0 ...
              ];

    case ’solution’
        out = [ ...
                exp(m*t).*sin(t)-3 ; ...
                cos(m*t)+1 ; ...
                cos(m*t)-1 ; ...
                exp(m*t).*sin(t) ...
              ];

    otherwise
        error([’+++ Unknown flag : ’,flag,’ +++’]);

end

%----------

function out = g1(m,t)
out = [ ...
        t*exp(m*t)*(m*sin(t)+cos(t))-10*exp(m*t)*sin(t)-12*cos(m*t)+9 ; ...
        -m*t*sin(m*t)+9*exp(m*t)*sin(t)+11*cos(m*t)-9 ...
      ];

function out = g2(m,t)
```

```
out = [ ...
        exp(m*t)*sin(t)+2*cos(m*t)-3 ; ...
        7/3*exp(m*t)*sin(t)+3*cos(m*t)-3 ...
      ];

```

```
function out = lin44(flag,t,x,xa,xb,varargin)

%*** Example 4.4 with free parameter m
m = -1; %*** = Example 4.4m1

B11 = [-8 -15 ; 10 17];
B12 = [3 -1 ; -2 1];
B21 = [1 1 ; 2 3];
B22 = [1/7 0 ; 0 1/4];

switch flag

    case 'tau'
        out = [0,1];

    case 'daeA'
        out = [t*eye(2) ; zeros(2,2)];

    case 'daeD'
        out = [eye(2) zeros(2,2)];

    case 'df/dy'
        out = -[B11 B12 ; B21 B22];

    case 'f'
        out = [g1(m,t);g2(m,t)];

    case 'R'
        out = [ ...
                2*xa(1)+3*xa(2) ; ...
                xb(1)+xb(2)-exp(m)*sin(1)-cos(m)+1.5 ; ...
                [B21 B22]*xa-g2(m,0) ...
              ];

    case 'dR/dya'
        out = [ ...
                2 3 0 0 ; ...
                0 0 0 0 ; ...
                B21 B22 ...
              ];

    case 'dR/dyb'
        out = [ ...
                0 0 0 0 ; ...
                1 1 0 0 ; ...
                0 0 0 0 ; ...
                0 0 0 0 ; ...
              ];

    case 'solution'
        out = [ ...
                exp(m*t).*sin(t)-1.5*t.^5 ; ...
                cos(m*t)+t.^5-1 ; ...
                cos(m*t)-1 ; ...
                exp(m*t).*sin(t) ...
              ];

    otherwise
        error(['+++ Unknown flag : ',flag,' +++']);

end


%----------

function out = g1(m,t)
out = [ ...
        t*exp(m*t)*(m*sin(t)+cos(t))-9*exp(m*t)*sin(t)-12*cos(m*t)-10.5*t^5+12 ; ...
        -m*t*sin(m*t)+11*exp(m*t)*sin(t)+15*cos(m*t)+7*t^5-15 ...
      ];
```

```
function out = g2(m,t)
out = [ ...
        exp(m*t)*sin(t)+8/7*cos(m*t)-0.5*t^5-8/7 ; ...
        9/4*exp(m*t)*sin(t)+3*cos(m*t)-3 ...
      ];
```

- We tried `ewa311k` for $k \in \{2, 2.5, 3, 3.5, 4, 4.5\}$.

```
function out = ewa311k(flag,t,y,ya,yb,k);
% Algebro-Differential-Gleichung (Problem 3.11 mit Parameter k)

if isa(k,'cell')
  k = k{1};
end

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 0];

  case 'df/dy'
    out = -[ 1/t^k , 0 ; 0 , k ];

  case 'f'
    out = [ k*t^(k-1)+1 ; 0 ];

  case 'R'
    out = [ ya(1) ; yb(1)-k*yb(2)-k-1];
    % x1(0) = 0
    % x1(1) - k*x2(1) = k + 1

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 -k ];

  case 'solution'
    out = [ t.^k ; -t.^(k-1) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
```

- We tried `ewa321k` for $k \in \{2, 2.5, 3, 3.5, 4, 4.5\}$.

```
function out = ewa321k(flag,t,y,ya,yb,k);
% Algebro-Differential-Gleichung (Problem 3.21 mit Parameter k)

if isa(k,'cell')
  k = k{1};
end


switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [ 1 1 ];

  case 'df/dy'
    out = -[ -1 0 ; 0 , exp(t.^k) ];

  case 'f'
    out = [ 0 ; exp(t.^k).*(exp(t.^k)-1).*(1-k*t.^(k-1)) ];

  case 'R'
    out = [ ya(1) ; yb(1)+yb(2)-exp(1)+1 ];
    % x1(0) = 0
    % x1(1) + x2(1) = exp(1) - 1

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 1 ];

  case 'solution'
    out = [ k*t.^(k-1).*exp(t.^k) ; exp(t.^k).*(1-k*t.^(k-1))-1 ];

  otherwise
    error('+++ Unknown flag +++')

end
```

```
function out = maerz011(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 0];

  case 'df/dy'
    out = - [ cos(t) 0 ; 0 exp(t) ];

  case 'f'
    out = [ cos(t)^2 - sin(t) ; -exp(2*t) ];

  case 'R'
    out = [ ya(1)-ya(2)-2 ; yb(1)-cos(1) ];
    % x1(0) - x2(0) = 2
    % x1(1) = cos(1)

  case 'dR/dya'
    out = [ 1 -1 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 0 ];

  case 'solution'
    out = [ cos(t) ; exp(-t) .* (sin(t) - exp(2*t)) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = maerz021(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 -1];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = - [t^2-1 , 0 ; 0 , t^2];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [1;1] * (sinh(t) + (t^2-1) * t^2 * cosh(t));

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1) ; yb(1)-yb(2)-cosh(1) ];
    % x1(0) = 0
    % x1(1) - x2(1) = cosh(1)

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 -1 ];

  case 'solution'
    out = [t.^2 .* cosh(t) ; (t.^2-1) .* cosh(t)];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = maerz0311(flag,t,y,ya,yb,varargin);

switch flag

  case ’tau’
    out = [0 1];

  case ’daeA’
    out = [1 ; 1];

  case ’daeD’
    out = [1 sin(t)];

  case ’df/dy’                    % +++ Die Matrix vor x (RHS) +++
    out = [ 0 cos(t) ; 0 cos(t)-exp(t) ];

  case ’f’                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ 1 ; ( t^4*exp(t)*(5*log(t)+1) +cos(t) -exp(t) ) / cos(t) ];

  case ’R’                        % +++ Konsistente Randbedingung +++
    out = [ya(2)+1 ; yb(1) ];
    % x2(0) = -1
    % x1(1) = 0

  case ’dR/dya’
    out = [0 1 ; 0 0];

  case ’dR/dyb’
    out = [0 0 ; 1 0];

  case ’solution’
    log_t = zeros(1,length(t));
    for j=1:length(t)
      if t(j)~=0
            log_t(j) = log(t(j));
      end
    end
    tmp = ( -t.^4.*exp(t).*(5*log_t+1) + exp(t) ) ./ cos(t) ./ exp(t);
    out = [ t.^5.*log_t + sin(t).* tmp ; -tmp ];

  otherwise
    error(’+++ Unknown flag +++’)

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : Radau OK
```

```
function out = maerz131(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 t^2];

  case 'daeR'
    out = [0 1];

  case 'df/dy'                      % +++ Die Matrix vor x (RHS) +++
    out = - [ 1/t -2*t ; 0 -2*t ];

  case 'f'                          % +++ Die Inhomogenitaet (RHS) +++
    out = [ -sin(t)/2 ; 2/3/t*(cos(t)-1) ];

  case 'R'                          % +++ Konsistente Randbedingung +++
    out = [ ya(1) ; yb(1)+yb(2)-2+cos(1)];
    % x1(0) = 0
    % x1(1) + x2(1) = 2 + cos(1)

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 1 ];

  case 'solution'

    warning off; % Division by zero
    tmp = (t.^2-cos(t)+1)./t.^2+sin(t)./t/2+2/3*t.^(-2).*(cos(t)-1);
    warning on;
    if t(1) == 0
      tmp(1) = 5/3; % this is the limit for x \to 0
    end
    out = [ -(t.*sin(t)/2 + 2/3*(cos(t)-1)) ; tmp ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% Collocation nodes:  : equidistant OK : Gaussian OK : failure for Radau
% - die zusaetzliche Randbedingung wird rechts gestellt
```

For the following examples, the boundary condition is not well-posed in the sense that we need some additional boundary condition for the substitution variable $u = Dx$ in the Form $\lambda_0 u(0) + \lambda_1 u(1) = \lambda_0 Dx(0) + \lambda_1 Dx(1)$. In the following cases this additional boundary condition and Roswitha's boundary condition are linearly dependent and therefore lead to singular system matrix.

```
function out = MAERZ122(flag,t,y,ya,yb,varargin);

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 -1];

  case 'df/dy'                    % +++ Die Matrix vor x (RHS) +++
    out = -[ 2 0 ; 0 t+2 ];

  case 'f'                        % +++ Die Inhomogenitaet (RHS) +++
    out = [ -t.*exp(5*t) ; -(8*t+7)/2.*t.*exp(5*t)];

  case 'R'                        % +++ Konsistente Randbedingung +++
    out = [ ya(1)-ya(2) ; yb(1)-yb(2)-exp(5) ];
    % x1(0) - x2(0) = 0
    % x1(1) - x2(1) = exp(5)

  case 'dR/dya'
    out = [ 1 -1 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 -1 ];

  case 'solution' % Exakte Loesung der DAE
    out = [ -(6*t+1)/2.*exp(5*t) ; -(8*t+1)/2.*exp(5*t) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% - Abbruch "System matrix is close to singular"
% - Abbruch auch fuer zusaetzliche Randbedingung rechts
```

```
function out = MAERZ311k(flag,t,y,ya,yb,k);
% Algebro-Differential-Gleichung (Problem 3.11 mit Parameter k)

if isa(k,'cell')
  k = k{1};
end

switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [1 0];

  case 'df/dy'
    out = -[ 1/t^k , 0 ; 0 , k ];

  case 'f'
    out = [ k*t^(k-1)+1 ; 0 ];

  case 'R'
    out = [ ya(1) ; yb(1)-1];
    % x1(0) = 0
    % x1(1) = 1

  case 'dR/dya'
    out = [ 1 0 ; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 0 ];

  case 'solution' % Exakte Loesung der DAE
    out = [ t.^k ; -t.^(k-1) ];

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% - Abbruch mit "System matrix is close to singular. Use a refined mesh."
```

```
function out = maerz321k(flag,t,y,ya,yb,k);
% Algebro-Differential-Gleichung (Problem 3.21 mit Parameter k)

if isa(k,'cell')
  k = k{1};
end


switch flag

  case 'tau'
    out = [0 1];

  case 'daeA'
    out = [1 ; 1];

  case 'daeD'
    out = [ 1 1 ];

  case 'daeR'
    out = [ 0 1 ];

  case 'df/dy'
    out = -[ -1 0 ; 0 , exp(t.^k) ];

  case 'f'
    out = [ 0 ; exp(t.^k).*(exp(t.^k)-1).*(1-k*t.^(k-1)) ];

  case 'R'
   out = [ ya(1)+ya(2) ; yb(1)+yb(2)-exp(1)+1 ]; % singulaere Matrix
   % x1(0) + x2(0) = 0
   % x1(1) + x2(1) = exp(1) - 1

  case 'dR/dya'
    out = [ 1 1; 0 0 ];

  case 'dR/dyb'
    out = [ 0 0 ; 1 1 ];


  case 'solutionX' % Exakte Loesung der DAE
    out = [ k*t.^(k-1).*exp(t.^k) ; exp(t.^k).*(1-k*t.^(k-1))-1 ];

  case 'solutionU' % zur Loesung X gehoerige Loesung der inherenten DGl
    if isempty(y)
      y = feval(mfilename,'solutionX',t,[],[],[],k); % ggf. Lsg der DAE holen
    end
    alpha = ones(1,length(t));
    out = y(1,:) + alpha .* y(2,:);

  otherwise
    error('+++ Unknown flag +++')

end

% BEMERKUNGEN:
% - Abbruch mit "System matrix is close to singular. Use a refined mesh."
```

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