numerical differentiation with one-sided difference quotients

$$D(h) = \frac{f(x_0 + h) - f(x_0)}{h}$$

h	$m = 0$	$m = 1$	$m = 2$	$m = 3$
h_0	$D(h_0) = D_{00}$	D_{01}	D_{02}	D_{03}
h_1	$D(h_1) = D_{10}$	D_{11}	D_{12}	D_{13}
h_2	$D(h_2) = D_{20}$	D_{21}	D_{22}	D_{23}
h_3	$D(h_3) = D_{30}$	D_{31}	D_{32}	D_{33}
h_4	$D(h_4) = D_{40}$	D_{41}	D_{42}	$\vdots$
h_5	$D(h_5) = D_{50}$	D_{51}	$\vdots$	
h_6	$D(h_6) = D_{60}$	$\vdots$		
$\vdots$	$\vdots$			

$$\begin{aligned} D_{i0} &= D(h_i) \\ D_{ij} &= D_{(i+1)\,(j-1)} - \frac{h_{i+j}}{h_{i+j} - h_i} \left[D_{(i+1)\,(j-1)} - D_{i\,(j-1)} \right], \qquad j \geq 1 \end{aligned}$$

numerical differentiation of $f(x) = |x|^{3/2}$ at $x = 0$

extrapolation error for one-sided difference quotients

h	m=0	m=1	m=2	m=3	m=4	m=5	m=6	m=7
2^0	1.00_0	4.14_{-1}	2.52_{-1}	1.68_{-1}	1.15_{-1}	8.06_{-2}	5.66_{-2}	3.99_{-2}
2^{-1}	7.07_{-1}	2.93_{-1}	1.79_{-1}	1.19_{-1}	8.17_{-2}	5.70_{-2}	4.00_{-2}	2.82_{-2}
2^{-2}	5.00_{-1}	2.07_{-1}	1.26_{-1}	8.40_{-2}	5.77_{-2}	4.03_{-2}	2.83_{-2}	
2^{-3}	3.54_{-1}	1.46_{-1}	8.93_{-2}	5.94_{-2}	4.08_{-2}	2.85_{-2}		
2^{-4}	2.50_{-1}	1.04_{-1}	6.31_{-2}	4.20_{-2}	2.89_{-2}			
2^{-5}	1.77_{-1}	7.32_{-2}	4.46_{-2}	2.97_{-2}				
2^{-6}	1.25_{-1}	5.18_{-2}	3.16_{-2}					
2^{-7}	8.84_{-2}	3.66_{-2}						
2^{-8}	6.25_{-2}							
error	$\sqrt{h}$	$\sqrt{h}$	$\sqrt{h}$	$\sqrt{h}$	$\sqrt{h}$	$\sqrt{h}$		

reason for "failure" of extrapolation: The function $D(h) = h^{-1}(|h|^{3/2} - 0) = \sqrt{|h|}$ is not "smooth" at $h = 0$.