

SPACE–TIME VIRTUAL ELEMENT METHOD FOR THE HEAT EQUATION

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ABSTRACT

We present a space-time virtual element method for the heat equation [1], which generalizes the finite element approach in [2] to polytopal meshes.

Local test and trial discrete functions are solutions to a heat equation with polynomial data. Global virtual element spaces are constructed in a nonconforming fashion, as this allows for a unified analysis that is independent of the spatial dimension and possible Trefftz variants.

The geometric flexibility of polytopal methods renders our approach very appealing in view of space-time adaptivity.

We present the theoretical details of the scheme and a convergence result, which we validate with several numerical experiments.

REFERENCES

- [1] S. Gómez, L. Mascotto, A. Moiola, I. Perugia. *Space–time virtual element methods for the heat equation*, in preparation.
- [2] O. Steinbach. *Space-time finite element methods for parabolic problems*”, *Comp. Meth. in Appl. Math.* 15(4), 2015, pp. 551-566.

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