

# VIRTUAL ELEMENTS, EXACT SEQUENCES, AND MAGNETIC PROBLEMS

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## ABSTRACT

We construct some virtual element spaces for the discretization of magnetic problems, including Maxwell equations [2] and resistive magnetohydrodynamic models [3]. Such virtual elements are particularly suited for the approximation of magnetic problems, as they form exact sequences [1] and satisfy exactly divergence-free constraints. Contextually, we review interpolation and stability properties of edge and face virtual elements [4, 5].

## REFERENCES

- [1] L. Beirão da Veiga, F. Brezzi, F. Dassi, L. D. Marini, A. Russo. *A Family of Three-Dimensional Virtual Elements with Applications to Magnetostatics*, SIAM J. Numer. Anal. 56(5), (2018), 2940–2962.
- [2] L. Beirão da Veiga, F. Dassi, G. Manzini, L. Mascotto. *Virtual elements for Maxwell's equations*, Comput. Math. Appl. Available on-line, (2022).
- [3] L. Beirão da Veiga, F. Dassi, G. Manzini, L. Mascotto. *The virtual element method for the 3D resistive magnetohydrodynamic model*, ArXiv available at <https://arxiv.org/abs/2201.04417>, (2022).
- [4] L. Beirão da Veiga, L. Mascotto. *Interpolation and stability properties of low order face and edge virtual element spaces*, IMA J. Numer. Anal. In press, (2022).
- [5] L. Beirão da Veiga, L. Mascotto, J. Meng. *Interpolation and stability estimates for edge and face virtual elements of general order*, ArXiv available at <https://arxiv.org/abs/2203.00303>, (2022).

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