Towards a fully space-time adaptive finite element method for magnetoquasistatics

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This paper reports on our current work on fully space-time adaptive magnetic field computation.

We describe a Whitney finite element method (WFEM) for solving a magnetoquasistatic formulation of Maxwell's equations on unstructured 3D tetrahedral grids, using the software package KARDOS. High order spatial discretization is achieved by employing the hierarchical tetrahedral H(curl)-conforming element proposed by Ainsworth and Coyle. For the time discretization we use linearly implicit one-step Rosenbrock methods up to 4th order accurate in time. To control the adaptive mesh refinement we extend the hierarchical error estimator proposed by Beck, Hiptmair and Wohlmuth to Rosenbrock methods.

Finally we present numerical results for the eddy current benchmark problem TEAM 7.

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