

Hybrid finite element methods for time harmonic Maxwell's equations

Martin Huber¹ Joachim Schöberl² Antti Hannukainen³

The topic of this talk is the solution of the time harmonic Maxwell's equations for high wave numbers with high order finite elements. We use discrete eigenfunctions as basis for the finite element spaces and therefore we can efficiently work with polynomial orders up to thousands. This allows us to resolve high frequent waves even on very coarse meshes. For structured rectangular grids the 2D eigenvalue problem decouples into two 1D problems. We compare two formulations of the problem: a primal hybrid- and a mixed hybrid formulation. Finally we present numerical examples to demonstrate the effectiveness of our approach.

¹RWTH Aachen, Center for Computational Engineering Science, Pauwelsstraße 19, 52074 Aachen, Germany,

huber@mathcces.rwth-aachen.de

²RWTH Aachen, Center for Computational Engineering Science, Pauwelsstraße 19, 52074 Aachen, Germany,

joachim.schoeberl@rwth-aachen.de

³RWTH Aachen, Center for Computational Engineering Science, Pauwelsstraße 19, 52074 Aachen, Germany,

ahannuka@cc.hut.fi