ANALYSIS OF AN HDG METHOD FOR MAXWELL'S EQUATIONS UNDER MINIMAL REGULARITY

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Abstract. We propose and analyze a hybridizable discontinuous Galerkin (HDG) method combined with the continuous Galerkin (CG) method to approximate Maxwell's equations [1]. We derive optimal convergence estimates for our HGD-CG approximation when the electromagnetic coefficients are piecewise smooth. This requires new techniques of analysis. Second, we use CG elements to approximate the Lagrange multiplier used to enforce the divergence condition and we obtain a discrete system in which we can decouple the discrete the Lagrange multiplier. Because we are using a continuous Lagrange multiplier space, the number of degrees of freedom devoted to this are less than for other HDG methods. We present numerical experiments to confirm our theoretical results.

Keywords: Maxwell equations, HDG, Numerical analysis, Frequency domain analysis

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