A posteriori error estimates for an HDG method for the Stokes problem

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Abstract

We introduce an *a posteriori* error estimator for a hybridizable discontinuous Galerkin (HDG) method for the gradient-velocity-pressure formulation of the Stokes problem. We establish reliability and local efficiency of our estimator for the L^2-error of the velocity gradient and the pressure and the H^1-error of the velocity, with constants which are independent of the viscosity and the size of the mesh. Finally, we provide numerical experiments showing the quality of the adaptive scheme based on our *a posteriori* error estimator.

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References

[1] COCKBURN, BERNARDO; GOPALAKRISHNAN, JAYADEEP; NGUYEN, NGOC CUONG; PERAIRE, JAUME; SAYAS, FRANCISCO-JAVIER, *Analysis of HDG methods for Stokes flow*, Math. Comp. 80, 274 (2010), 723-760.

[2] COCKBURN, BERNARDO; ZHANG, WUJUN, *A posteriori analysis for hybridizable discontinuous Galerkin methods for second order elliptic problems*, SIAM J. Numer. Anal. 51, 1 (2013), 676-693.