Analysis of an adaptive HDG method for the Brinkman problem

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We introduce and analyze a hybridizable discontinuous Galerkin (HDG) method for the gradient-velocity-pressure formulation of the Brinkman problem. We present an *a priori* error analysis of the method, showing optimal order of convergence of the error. We also introduce an *a posteriori* error estimator, of the residual type, which helps us to improve the quality of the numerical solution. 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 physical parameters and the size of the mesh. In particular, our results are also valid for the Stokes problem. Finally, we provide numerical experiments showing the quality of our adaptive scheme.

References

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