Second-Order EllipticPDE with discontinuous boundary conditions

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Abstract

We will consider the weak formulation of linear elliptic PDE with discontinuous Dirichlet boundary conditions. Since such problems are typically not well-defined in the standard $H^1 - H^1$ setting, we will introduce a suitable saddle point formulation in terms of weighted Sobolev spaces. Furthermore, we will discuss the numerical solution of such problems. Specifically, we employ an hp–discontinuous Galerkin method and derive an L^2-norm a posteriori error estimate. Numerical experiments demonstrate the effectiveness of the proposed error indicator in both the h– and hp–version setting. Indeed, in the latter case exponential convergence of the error is attained as the mesh is adaptively refined.