AN ADAPTIVE RESIDUAL MINIMIZATION METHOD BASED ON HDG FORMULATIONS IN PRIMAL FORM

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Abstract. The aim of this talk is to present a residual minimization method based on hybridizable discontinuous Galerkin (HDG) schemes in primal form (see [1, 3]). The method is stated in terms of a minimization problem, where the discrete solution is obtained as the minimizer, in an adequate conforming discrete space, of the residual in a discrete dual space. This methodology leads to a discrete saddle point problem that delivers a residual representative in addition to the discrete solution. The residual measured in an energy norm can automatically drive adaptive mesh refinements. We verify that, under a saturation assumption, this kind of error estimator has the properties of reliability and efficiency. The main advantage of the proposed method is that the HDG nature of the formulation allows for static condensation, with a notorious reduction of the global degrees of freedom required for its resolution (see [2]). We demonstrate the method's performance using numerical experiments in the setting of diffusion problems.

Keywords: hybridizable discontinuous Galerkin methods, residual minimization, saddle point problem, saturation assumption, implicit estimator, diffusion problems.

Mathematics Subject Classifications (2010): 65N12, 65N15, 65N30, 65N50

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