A HIGH ORDER HDG METHOD FOR CURVED-INTERFACE PROBLEMS

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ABSTRACT. We generalize the technique of [*Solving Dirichlet boundary-value problems on curved domains by extensions from subdomains*, SIAM J. Sci. Comput. 34, pp. A497–A519 (2012)] to elliptic problems with mixed boundary conditions and elliptic interface problems involving a non-poligonal interface. We study first the treatment of the Neumann boundary data since it is crucial to understand the applicability of the technique to curved interfaces. We provide numerical results showing that, in order to obtain optimal high order convergence, it is desirable to construct the computational domain by interpolating the boundary/interface using piecewise linear segments. In this case the distance of the computational domain to the exact boundary is only $O(h^2)$.

Keywords: Discontinuous Galerkin, high order, curved boundary, curved interface.

Mathematics Subject Classifications (2010): 65N30

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