TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

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A hybridizable and superconvergent discontinuous Galerkin method for elliptic problems

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Abstract.

We introduce and analyze a new discontinuous Galerkin method for solving the second-order elliptic problem $\Delta u = f$ and the biharmonic problem $\Delta^2 u = f$. The method has three main, distinctive features. The first is that the method is hybridizable; this renders it efficiently implementable and competitive with the main existing methods for these problems. The second is that, when the method uses polynomial approximations of the same degree for u and its derivatives, optimal convergence properties are obtained for both u and the gradient of u. The third is that the method exhibits superconvergence properties of the approximation to u; this allows us to postprocess the approximation in an element-by-element fashion to obtain another approximation to u which converges faster than the original one.