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Differential Equations and Applied Math Seminar

Dr. Young Ju Lee, Texas State University

11am-12pm October 7th, 2016

333 Derrick Hall

Title: A Locally Conservative Enriched Galerkin Approximation and Efficient Solver for Elliptic and Parabolic Problems

Abstract: We present and analyze an enriched Galerkin finite element method (EG) to solve elliptic and parabolic equations with jump coefficients. The EG is formulated by enriching the conforming continuous Galerkin finite element method (CG) with piecewise constant functions. The method is shown to be locally and globally conservative, while keeping fewer degrees of freedom in comparison with discontinuous Galerkin finite element methods (DG). Moreover, we present and analyze a fast effective EG solver whose cost is roughly that of CG and which can handle an arbitrary order of approximations. A number of numerical tests in two and three dimensions are presented to confirm our theoretical results as well as to demonstrate the advantages of the EG when coupled with transport.

The presentation is based on joint publication at SIAM J. Sci. Comp in 2016 with S. Lee and M. Wheeler.

Interested faculty and graduate students are encouraged to attend.