Discontinuous Galerkin Finite Element Method for Multiscale Problems

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ABSTRACT

In this talk, we first give a brief introduction to the discontinuous Galerkin method, which is a finite element method using completely discontinuous basis functions, for solving hyperbolic conservation laws and parabolic and elliptic equations. We will then survey the progress in developing discontinuous Galerkin methods for multiscale problems, in three different approaches, namely using the heterogeneous multiscale method (HMM) framework, using domain decompositions, and using multiscale basis in the discontinuous Galerkin method. Numerical results will be shown to demonstrate the effectiveness of the multiscale discontinuous Galerkin methods.