HYBRIDIZED DISCONTINUOUS GALERKIN METHODS FOR COMPUTATIONAL MECHANICS

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Discontinuous Galerkin (DG) methods for solving the Navier-Stokes equations have received considerable attention in recent years because of their potential to produce highly accurate solutions with minimum numerical dissipation. Applications such as LES or aero-acoustics demand high accuracy and low dispersion and hence are clear candidates for high order methods. DG methods produce stable discretizations of the convective operator for arbitrary accuracy orders. Moreover, Discontinuous Galerkin methods can be used with unstructured meshes of tetrahedra, which is a requirement for real-world complex geometries.

In the talk, I will describe a new class of hybridizable discontinuous Galerkin (HDG) methods for the numerical solution of the systems of conservation laws. In addition to possessing local conservativity, high-order accuracy, and strong stability for convection-dominated flows, the proposed HDG methods result in a reduced number of globally coupled degrees of freedom than other DG methods. Our current frammework allows us to consider in a unified manner applications in CFD, solid mechanics and wave propagation.