Department of Mathematics

University of Houston

Scientific Computing Seminar

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Discretely entropy stable discontinuous Galerkin methods

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1:30 PM- 2:30 PM
Room 646 PGH

Abstract: High order methods offer several advantages in the approximation of solutions to time-dependent hyperbolic equations, such as improved accuracy and low numerical dispersion and dissipation. However, high order methods also tend to suffer instabilities when applied to nonlinear hyperbolic equations, requiring filtering, limiting, or artificial dissipation to ensure that the solution does not grow unboundedly in time. At the root of these problems is the fact that the stability of the continuous problem does not imply stability at the discrete level. This talk will review the development of high order discretizations which recover a semi-discrete statement of entropy stability, and will discuss the extension of existing schemes to a more general class of discontinuous Galerkin methods. Finally, we discuss extensions to curved meshes, and present numerical experimentsconfirming theoretical resultsfor thecompressible Euler equations.