LILIA KRIVODONOVA, University of Waterloo

Stabilization techniques for solution of hyperbolic conservation laws on unstructured nonconforming meshes

In order to resolve fine features of a numerical solution, run-time mesh refinement might be required. Commonly used refinement strategies aimed at preserving mesh quality result in nonconfirming meshes, i.e. meshes where a larger element might share an edge with several smaller elements. In this talk we will address solution stabilization techniques on such meshes using limiters. Limiting is a technique aimed at suppressing nonphysical oscillations in a numerical solution in the presence of shocks and steep solution gradients. Limiting on nonconforming meshes is difficult due to lack of structure in the mesh and because most limiting algorithms were developed for conforming meshes. The proposed limiter modifies solution coefficients (or moments) by reconstructing the slopes along a set of directions in which the moments decouple. The resulting solutions satisfy the local maximum principle (LMP) for scalar problems, i.e. are stable in the maximum norm. We show that our algorithm is efficient for solution of nonlinear hyperbolic systems such as Euler equations and scales well when implemented on GPUs.