6th European Conference on Computational Mechanics (ECCM 6)
7th European Conference on Computational Fluid Dynamics (ECFD 7)
11 – 15 June 2018, Glasgow, UK

LOCALLY BOUND PRESERVING LIMITERS ON UNTSTRUCTURED MESHES FOR HYPERBOLIC PROBLEMS

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Key Words: *Limiters, discontinuous Galerkin methods, stability.*

We present new second order limiters for the discontinuous Galerkin method applied to hyperbolic conservation laws. We prove that under a suitable time step restriction, the limiters enforce the local maximum principle for linear and nonlinear scalar equations on unstructured triangular meshes. We also show that this time step size constraint is tight. We discuss under what restrictions limiters that control the solution slope by sampling solution values at the edges of a computational element are second order accurate and enforce the local bound.

We also present a new approach to limiting on triangular meses. The new limiter works by finding directions in which solution coefficients on each element can be separated and limits them independently of one another by comparing to forward and backward reconstructed differences. The limiter has a precomputed stencil of constant size, which provides computational advantages in terms of implementation and run time. We provide examples that demonstrate stability and second order accuracy of solutions.

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