CENTRAL WENO SUBCELL FINITE VOLUME LIMITERS FOR ADER DISCONTINUOUS GALERKIN SCHEMES ON FIXED AND MOVING UNSTRUCTURED MESHES

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We present a novel *a posteriori* subcell finite volume limiter for high order discontinuous Galerkin (DG) finite element schemes for the solution of nonlinear hyperbolic PDE systems in multiple space dimensions on fixed and moving unstructured simplex meshes. The numerical method belongs to the family of high order fully discrete one-step ADER-DG schemes [2] and makes use of an element-local space-time Galerkin finite element predictor. Our limiter is based on the MOOD paradigm, in which the discrete solution of the high order DG scheme is checked *a posteriori* against a set of physical and numerical admissibility criteria, in order to detect spurious oscillations or unphysical solutions and in order to identify the so-called troubled cells. Within the detected troubled cells the discrete solution is then *discarded* and *recomputed* locally with a more robust finite volume method on a fine subgrid.

In this work, we propose for the first time to use a high order ADER-CWENO finite volume scheme as subcell finite volume limiter on unstructured simplex meshes, instead of a classical second order TVD scheme. Our new numerical scheme has been developed both for fixed Eulerian meshes as well as for moving Lagrangian grids. It has been carefully validated against a set of typical benchmark problems for the compressible Euler equations of gas dynamics and for the equations of ideal magnetohydrodynamics (MHD).

REFERENCES

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