A 3D SYMMETRIC CELL-CENTERED LAGRANGIAN SCHEME BASED ON A MULTI-DIMENSIONAL MINMOD LIMITER

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The gas dynamic equations under the Lagrangian formalism are well adapted to the simulation of multi-material compressible fluid flows such as those encountered in the domain of Inertial Confinement Fusion (ICF). Different cell-centered finite volume schemes have been developed for solving these equations [1, 2]. In these schemes, the node velocity is computed by imposing a momentum balance conservation condition around each node. The multi-dimensional scheme presented here is a symmetric version of [3] for unstructured meshes. Both momentum and total energy are globally conserved. The second order extension is based on a piecewise linear reconstruction of the pressure and velocity fields obtained via a least squares procedure. A new slope limiter based on a multi-dimensional extension of the minmod method is developed to ensure the monotonicity. Several academic test cases are studied in order to prove the robustness and accuracy of the scheme.

REFERENCES

