A posteriori MOOD limiting approach for multicomponent flows on unstructured meshes

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In this work we present the extension of a relaxed multidimensional optimal order detection (MOOD) algorithm [3] to multicomponent flows using unstructured meshes. In particular the diffused interface method is employed [5] using the Allaire 5 equation model [4] and the stiffened equation of state. High-order linear and non-linear methods are deployed, and all the methods and algorithms are implemented in the open-source ucns3d CFD code [6].

The performance of several numerical methods is assessed in terms of accuracy, non-oscillatory behaviour and computational cost. The primary air is to reduce the computational foot-print of the MOOD algorithm, by tuning the numerical admissible detection criteria for solutions, and selecting primitive or characteristic variable reconstruction. Several stringent test problems are employed such as shock wave interaction with bubbles, multicomponent shock tube problems, and multiple types of instabilities.

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