ADAPTIVE WEIGHTED ESSENTIALLY NON-OSCILLATORY SCHEME FOR EULER SYSTEM OF COMPRESSIBLE GAS DYNAMICS

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ABSTRACT
In this paper, we present an adaptive weighted essentially non-oscillatory (WENO) algorithm for Euler equations of conservation laws. WENO scheme is a well-known high order oscillation-control scheme for hyperbolic conservation laws, which is computationally expensive because it computes non-linear weights at each numerical points which involves computations of smooth-indicators. An effective multi-resolution approximation (MRA) is used to adapt the algorithm so that WENO is used at only discontinuous points. Much computational cost is saved in this way without loss of the accuracies of the numerical solutions. We show several numerical examples to verify the computational efficiency of our approach. The CPU time is proportional to the number of adaptive grid points.

REFERENCES
Figure 1. Density profiles on adaptive grids for the conventional double mach reflection problem: the compression threshold $\varepsilon = 5.0 \times 10^{-3}$ and $pa$ is the percentage of the number of adaptive grid points over the full grid points in the highest resolution level.