

A New Multi-Dimensional Limiter for Hybrid Grid

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For the finite volume method, the reconstruction step is employed to obtain the states for the calculation of numerical fluxes at the faces. To remove the non-physical oscillations, a limiting procedure is required. This limiting procedure is so important that it not only influence the numerical accuracy in the smooth regions but also affect the robustness of the solver. For the unstructured meshes, the design of the limiting procedure is not trivial. The well-known and wide-used limiting procedure is proposed by Barth and Jespersen in 1989 and lately improved by Venkatakrishnan in 1993. However, the overshoot or undershoot phenomenon can still be observed. In this paper, a new limiter for hybrid grid is proposed. It limits the state variables of a face directly from the corresponding variables of this face's neighbor cells. It is so simple that it can be easily adopted in many solvers based on unstructured grid.

Keywords: finite volume, multi-dimensional limiter, hybrid grid