

Entropy-preserving high-order schemes for the Euler equations

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We study the convergence in the sense of the Lax-Wendroff theorem of high-order schemes towards entropy solutions of the Euler equations. It is a very difficult task to derive high-order methods that satisfy the relevant discrete entropy inequalities. Actually, we are able to check numerically that these inequalities are violated in the case of the classical MUSCL method. We propose a new scheme based on an additional a posteriori limitation of the reconstruction. This scheme is able to recover all the required discrete entropy inequalities, while preserving the order of convergence of the initial MUSCL scheme.