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On the Mach-Uniformity of Lagrange-Projection Scheme

In the present work, we show that the Lagrange-projection scheme presented in Coquel et al.'s paper (Math. of Comp. \textbf{79}.271 (2010): 1493–1533), is asymptotic preserving for isentropic Euler equations, i.e. at the discrete level it preserves the incompressible limit, satisfies the *div*-free condition as well as the asymptotic expansion for the density in the continuous level. Moreover, we prove that the scheme is positivity-preserving, L_∞ -stable and entropy-admissible under some Mach-uniform restrictions. The analysis is similar to what has been presented in the original paper, but with the emphasis on the uniformity regarding the Mach number.

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