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Dr. Patrick Bontoux
Editor,
Computers & Fluids

Dear Dr. Bontoux,

Please find attached a copy of our manuscript titled “Entropy-based viscous regularization for the multi-dimensional Euler equations in low-Mach and transonic flows” for submission to *Computers & Fluids*.

In this paper, we present a new version of the entropy viscosity method that is well-suited to low-Mach flows. Our alternate expressions for the entropy viscosity coefficients are derived using a low-Mach asymptotic study. The new definitions are valid for a wide range of Mach numbers, from subsonic flows (with very low Mach numbers) to supersonic flows, and no longer depend on an analytical expression for the entropy function. The effectiveness of the method is demonstrated using various 1-D and 2-D benchmark tests. Convergence studies are performed for both smooth solutions and solutions with shocks present.

This work is an extension of the entropy viscosity method, a viscous regularization technique for hyperbolic conservation laws introduced by Guermond et al., such that low-Mach but also supersonic flows can be handled by the technique.

Thank you for considering this manuscript for publication in *Computers & Fluids*.

Best regards,

Marc Delchini, Jean Ragusa, Ray
Berry