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Professor William Martin
Editor,
Journal of Computational Physics

Dear Professor Martin,

Please find attached a copy of our manuscript titled "Numerical solution of the 1-D grey radiation hydrodynamics equations with an entropy-based artificial viscosity" for submission to the *Journal of Computational Physics*.

A viscous stabilization based on entropy production is derived for the 1D grey radiation hydrodynamics equations. The technique is independent of the choice of spatial discretization and we have chosen to solve the equations with *continuous* finite elements. We extended the entropy-based stabilization, devised by Guermond et al. for Euler equations, to the radiation hydrodynamics equations (with grey non equilibrium diffusion). Several typical 1-D radiation-hydrodynamic test cases with shocks (from Mach 1.05 to Mach 50) are computed to establish the ability of the technique at capturing and resolving shocks. Most of the numerical test cases are taken from Lowrie and Edwards (Radiative shock solutions with grey non equilibrium diffusion, *Shock Waves* (2008) 18:129-143).

This work follows closely prior works on Radiative shock solutions. The suggested reviewers are: Rob Lowrie (LANL), James Stone (Princeton University), and Robert Rieben (LLNL).

Thank you for considering this manuscript for publication in JCP.

Best regards,

Marc Delchini, Jim Morel, Jean Ragusa