UNIVERSITÀ DEGLI STUDI DI BRESCIA

DIPARTIMENTO DI INGEGNERIA CIVILE ARCHITETTURA, TERRITORIO, AMBIENTE E DI MATEMATICA

"Non-equilibrium-diffusion limit of the compressible Euler-P1 approximation model arising from radiation hydrodynamics"

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Abstract: In this talk, we first show the non-equilibrium-diffusion limit of the compressible Euler-P1 approximation model arising in radiation hydrodynamics as the Mach number tends to zero when the initial data is well-prepared. In particular, the effect of the large temperature variation upon the limit is taken into account. The model leads to a singular problem which fails to fall into the category of the classical theory of singular limits for quasilinear hyperbolic equations.
By introducing an appropriate normed space of solutions and exploiting the structure of the system, we establish the uniform local existence of smooth solutions and the convergence of the model to the incompressible nonhomogeneous Euler system coupled with a diffusion equation. Moreover, we also prove the non-equilibrium-diffusion limit of the compressible Euler-P1 approximation model when the Mach number is fixed.