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Green's function and large time behavior of the Navier-Stokes-Maxwell system

Renjun Duan

(Submitted on 11 Jul 2011)

In this paper, we are concerned with the system of the compressible Navier-Stokes equations coupled with the Maxwell equations through the Lorentz force in three space dimensions. The asymptotic stability of the steady state with the strictly positive constant density and the vanishing velocity and electromagnetic field is established under small initial perturbations in regular Sobolev space. For that, the dissipative structure of this hyperbolic-parabolic system is studied to include the effect of the electromagnetic field into the viscous fluid and turns out to be more complicated than that in the simpler compressible Navier-Stokes system. Moreover, the detailed analysis of the Green's function to the linearized system is made with applications to derive the rate of the solution converging to the steady state.

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