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The boundary layer problem on the incompressible MHD system with non-characteristic Dirichlet boundary condition for velocity

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In this paper, we study the boundary layer and vanishing viscosity-diffusion limit problem for the incompressible magneto-hydrodynamic (MHD) system, which has the non-characteristic Dirichlet boundary condition for the velocity and the perfect conducting wall boundary condition for the magnetic field. Using the multiscale analysis and asymptotic expansion approach, we can obtain the inner function equations and boundary layer equations. By solving the boundary layer equations, we find that the velocity has the low order boundary layer, and the magnetic field has the high order boundary layer. Then we use the inner functions and the boundary layer functions to construct the approximate solutions. At last, utilizing the elaborate energy methods, we can strictly prove that the solutions of the viscous and diffuse MHD system can be approximated by the approximate solutions when the viscosity and diffusion coefficient tend to zero.

Biography

Na Wang is mainly engaged in the study of partial differential equations of fluid mechanics, especially the study of boundary layer problems in MHD system.

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