

Exact Solutions of the Nonideal Magnetohydrodynamic Equations

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Abstract: The time evolution of hydromagnetic waves in a nonideal magnetohydrodynamic (MHD) fluid is investigated. Exact time-dependent wave solutions of the nonlinear resistive and dissipative MHD equations for a plane geometry are presented to show that the magnetic field and the velocity have different damping times and that in the asymptotic limit $t \rightarrow \infty$ the fluid relaxes toward the equilibrium state with no magnetic and velocity fields.