

Hydrostatic, ideal-gas reference states in spherical coordinates

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1 The Induction Term

We consider the ideal (resistance-free) magnetohydrodynamic (MHD) induction equation:

$$\frac{\partial \mathbf{B}}{\partial t} = \nabla \times (\mathbf{u} \times \mathbf{B}), \tag{1}$$

$$= \mathbf{B} \cdot \nabla \mathbf{u} - \mathbf{u} \cdot \nabla \mathbf{B} - (\nabla \cdot \mathbf{u}) \mathbf{B}. \tag{2}$$