

$$\frac{\partial \mathbf{u}}{\partial t} = \nu \nabla^2 \mathbf{u} - 2\boldsymbol{\Omega} \times \mathbf{u} + [g\mathbf{e}_r + \boldsymbol{\Omega} \times (\boldsymbol{\Omega} \times \mathbf{r})] \alpha (T - T_r) - \frac{1}{\rho_0} \nabla p - (\mathbf{u} \cdot \nabla) \mathbf{u},$$

$$\frac{\partial T}{\partial t} = \kappa \nabla^2 T - (\mathbf{u} \cdot \nabla) T,$$

$$\nabla \cdot \mathbf{u} = 0,$$