

Strong Bernoulli eq.

$$\frac{\partial \mathbf{u}}{\partial t} - \mathbf{u} \times \boldsymbol{\omega} = -\nabla(gz) - \frac{1}{\rho} \nabla p - \nabla \left(\frac{1}{2} u^2 \right) = -\nabla \left[gz + \int \frac{dp}{\rho(p)} + \frac{1}{2} u^2 \right]$$

$$\Rightarrow \frac{\partial \phi}{\partial t} + \frac{1}{2} u^2 + \int \frac{dp}{\rho(p)} + gz = F(t)$$