- Continue discussing the irrotational flow approximation and introduce **superposition**.
- Discuss some elementary planar irrotational flows (building block flows)
- Do some examples of superposition

D. Approximation for Inviscid Regions of Flow (continued)

1. Definition of Inviscid Regions of Flow and the Euler Equation
2. Equations of Motion for Irrotational Flow
3. 2-D Irrotational Flow (continued)
   a. Equations of motion

Summary, equations for 2-D, steady, incompressible, irrotational flow in *x*-*y* plane:

$$\boxed{\vec{\nabla}\times\vec{V}=0} \quad \boxed{\vec{V}=\vec{\nabla}\phi} \quad \boxed{\nabla^2\phi=0} \quad \boxed{\nabla^2\psi=0} \quad \boxed{\frac{P}{\rho g}+\frac{V^2}{2g}+z=\text{constant everywhere}}$$

Cartesian: $\boxed{\nabla^2\phi=\frac{\partial^2\phi}{\partial x^2}+\frac{\partial^2\phi}{\partial y^2}=0}$ Cylindrical: $\boxed{\nabla^2\phi=\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial\phi}{\partial r}\right)+\frac{1}{r^2}\frac{\partial^2\phi}{\partial\theta^2}=0}$

   b. Superposition