

Particle Paths:	$\frac{d\underline{x}}{dt} = \underline{u}$
Streamline:	$\frac{dx}{u} = \frac{dy}{v} = \frac{dz}{w}$
Material Derivative:	$\frac{D}{Dt} \equiv \frac{\partial}{\partial t} + \underline{u} \cdot \nabla$
Divergence theorem:	$\int_V \nabla \cdot \underline{a} dV = \int_S \underline{a} \cdot \underline{n} dS$
Integral form of continuity equation:	$\int_V \frac{\partial \rho}{\partial t} dV = - \int_S \rho \underline{u} \cdot \underline{n} dS$
Derivative form of continuity equation:	$\frac{D\rho}{Dt} + \rho(\nabla \cdot \underline{u}) = 0$
Integral form of hydrostatic equilibrium:	$\int_V \rho \underline{F} dV = \int_S \rho \underline{n} dS$
Derivative form of hydrostatic equilibrium:	$\nabla p = \rho \underline{F}$
Euler's equation:	$\frac{D\underline{u}}{Dt} = -\frac{1}{\rho} \nabla p + \underline{F}$
Bernoulli's equation:	$\frac{1}{2} \underline{u} \cdot \underline{u} + \int \frac{dp}{\rho} + \Omega = const$
Vorticity:	$\underline{w} = \nabla \times \underline{u}$
Stream functions:	$\underline{u} = \left( \frac{\partial \psi}{\partial y}, -\frac{\partial \psi}{\partial x} \right)$ $\underline{u} = \left( \frac{1}{r} \frac{\partial \psi}{\partial \theta}, -\frac{\partial \psi}{\partial r} \right)$ $\underline{u} = \left( \frac{1}{r^2} \frac{\partial \psi}{\partial \theta}, -\frac{1}{r \sin \theta} \frac{\partial \psi}{\partial r} \right)$
Scalar Potential:	$\underline{u} = \nabla \phi = \left( \frac{\partial \phi}{\partial x}, \frac{\partial \phi}{\partial y} \right)$
Complex potential:	$w(z) = \phi + i\psi$
Complex velocity:	$\frac{dw}{dz} = u - iv$
Streamlines:	$\psi = \text{Im}(w) = const$
Uniform stream:	$w(z) = Uz e^{-ia}$
Source:	$w(z) = \frac{m}{2\pi} \log(z - z_0)$
Vortex:	$w(z) = -\frac{ik}{2\pi} \log(z - z_0)$
Dipole:	$w(z) = -\frac{m e^{ia}}{2\pi(z - z_0)}$
Flow in a corner:	$w(z) = Az^m$