

BA2 : Mécanique des fluides : Formulaire

Hydrostatique	$p + \rho g z = cste$		Viscosité	$\nu = \frac{\mu}{\rho}$
Bernoulli	$\alpha_1 \frac{u_1^2}{2g} + \frac{p_1}{\rho g} + z_1 = \alpha_2 \frac{u_2^2}{2g} + \frac{p_2}{\rho g} + z_2 + \Delta H_{1-2}$			
Continuité	$\frac{\partial \rho}{\partial t} + \operatorname{div}(\rho \bar{v}) = 0$	Comportement	$\tau_{xy} = \mu \left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} \right)$	
Mouvement	$\rho \ddot{v} + \bar{v} \cdot \operatorname{grad}(\rho \bar{v}) = \bar{f} + \operatorname{div} \bar{\sigma}$		$\sigma_x = -p + 2\mu \left(\frac{2}{3} \frac{\partial u}{\partial x} - \frac{1}{3} \frac{\partial v}{\partial y} \right)$	
Navier-Stokes	$\rho \left(\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} u + \frac{\partial u}{\partial y} v \right) = \rho g_x - \frac{\partial p}{\partial x} + \mu \Delta u$		$\rho \left(\frac{\partial v}{\partial t} + \frac{\partial v}{\partial x} u + \frac{\partial v}{\partial y} v \right) = \rho g_y - \frac{\partial p}{\partial y} + \mu \Delta v$	
Poiseuille	$u(r) = \frac{\Delta \hat{p}}{4\mu L} (R^2 - r^2)$		Nombre de Reynolds	$\operatorname{Re} = \frac{ud}{\nu}$