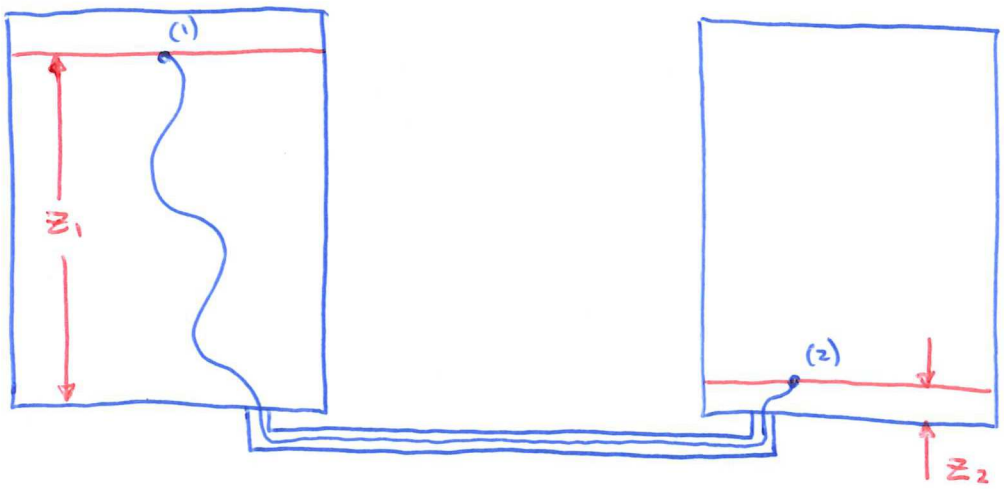
Fluid Mechanics

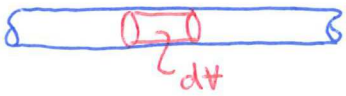


Bernollis Equation

$$\frac{P_1}{\rho g}\ (\text{atm}) + \frac{V_1^2}{2g}\ (\text{neglect}) + z_1 = \frac{P_2}{\rho g}\ (\text{atm}) + \frac{V_2^2}{2g}\ (\text{neglect}) + z_2 + \sum h_L$$

Solve for V in pipe:

Solve for change in volume:



$$\text{Flow rate} = Q = \frac{d\forall}{dt} = VA = V\pi\frac{D^2}{4}$$

so

$$\boxed{d\forall = V\pi\frac{D^2}{4}\,dt}$$