BERNOULLI'S EQUATION

Fluid Mechanics

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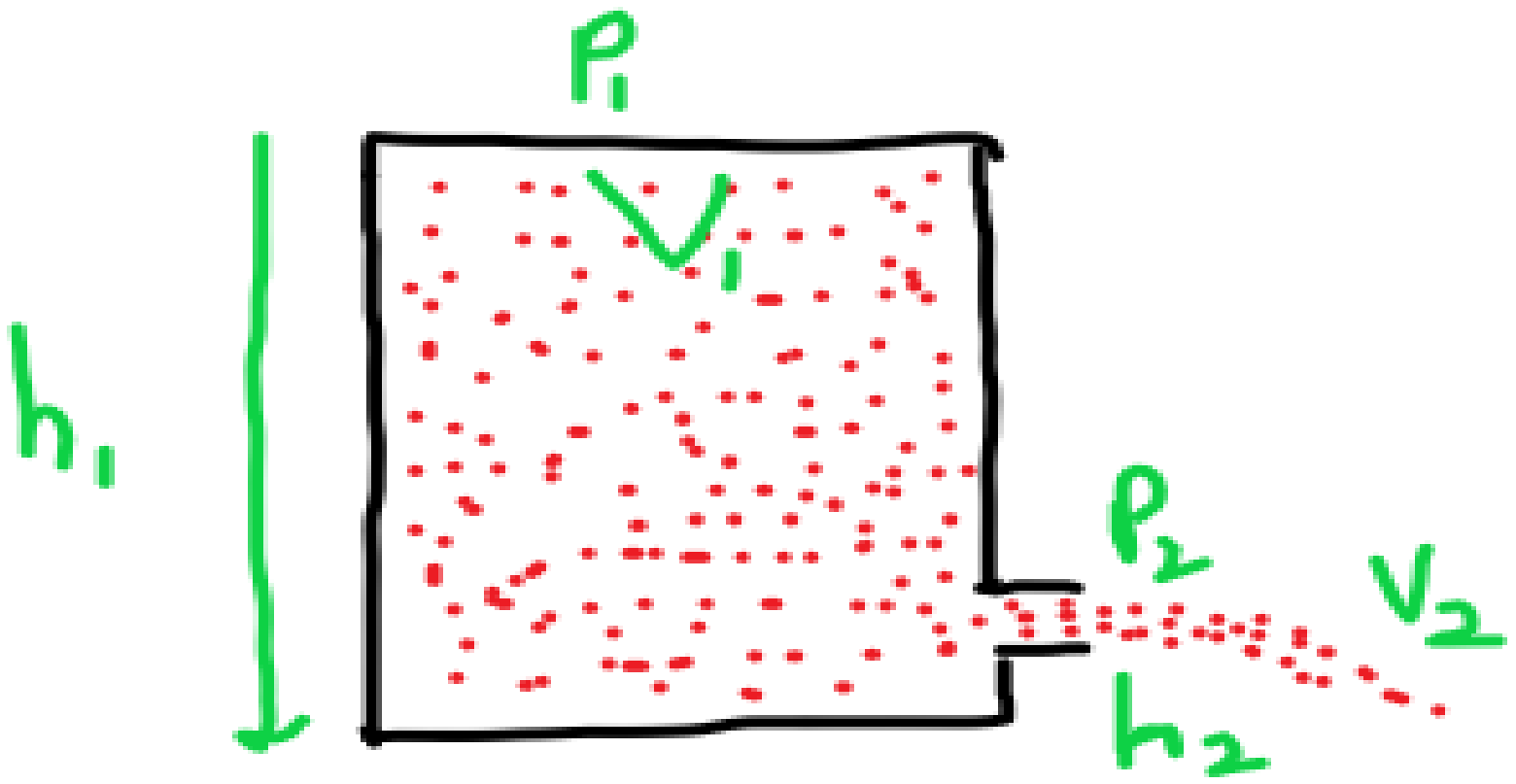
P_1
V_1
h_1
P_2
V_2
h_2

TORICILL'S THEORM (HIEGHT – VELOCITY RELATION)

$$(P_1 + \frac{1}{2}\rho V_1^2 + \rho g h_1) = (P_2 + \frac{1}{2}\rho V_2^2 + \rho g h_2)$$

Pressure on both sides is the atmospheric pressure which can be neglected.

$$P_1 = P_2 = atm$$

Hence;

$$(\frac{1}{2}\rho V_1^2 + \rho g h_1) = (\frac{1}{2}\rho V_2^2 + \rho g h_2)$$

$$\left(\frac{1}{2}\rho V_1^2 + \rho g h_1\right) = \left(\frac{1}{2}\rho V_2^2 + \rho g h_2\right)$$

since V_1 is very small and approximately zero

hence;

$$\rho g h_1 = \frac{1}{2}\rho V_2^2 + \rho g h_2$$

$$g h_1 = \frac{1}{2} V_2^2 + g h_2$$

$$\frac{1}{2} V_2^2 = g h_1 - g h_2$$

$$V_2^2 = 2(g h_1 - g h_2)$$

$$V_2 = \sqrt{2g(h_1 - h_2)}$$