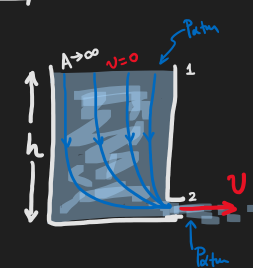
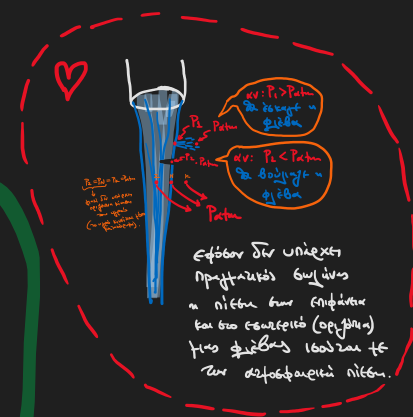


Εφαρμογές Δυναμικού BERNOULLI

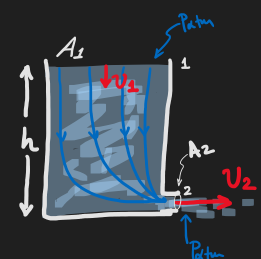
Δείκτης Torricelli



$$\begin{aligned} P_1 + \frac{1}{2}\rho v_1^2 + \rho g h &= P_2 + \frac{1}{2}\rho v_2^2 + \rho g 0 \Rightarrow \\ \Rightarrow P_{atm} + \rho g h &= P_{atm} + \frac{1}{2}\rho v^2 \Rightarrow \\ \Rightarrow \rho g h &= \frac{1}{2}\rho v^2 \Rightarrow \\ \Rightarrow 2gh &= v^2 \Rightarrow \\ \Rightarrow v &= \sqrt{2gh} \quad \text{Το Torricelli} \\ &\quad \text{Δε Θ.Α.} \end{aligned}$$

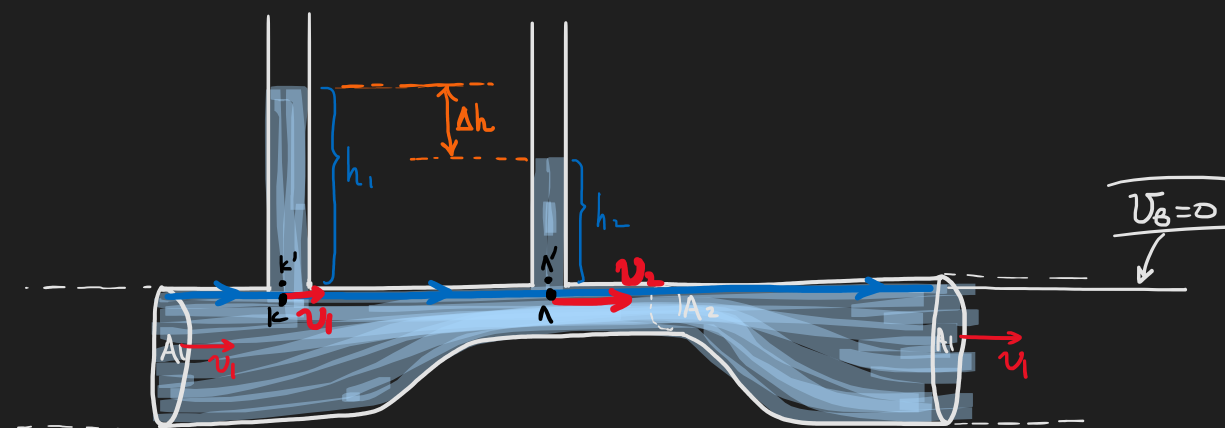


Γενικευμένος Δείκτης Torricelli



$$\begin{aligned} \Pi_1 &= \Pi_2 \Rightarrow A_1 v_1 = A_2 v_2 \Rightarrow \\ \Rightarrow v_1 &= \frac{A_2 v_2}{A_1} \quad (1) \\ P_1 + \frac{1}{2}\rho v_1^2 + \rho g h &= P_2 + \frac{1}{2}\rho v_2^2 + \rho g 0 \Rightarrow \\ \Rightarrow \frac{1}{2}\rho v_1^2 + \rho g h &= \frac{1}{2}\rho v_2^2 \Rightarrow \\ \Rightarrow v_1^2 + 2gh &= v_2^2 \xrightarrow{(1)} \frac{A_2^2 v_2^2}{A_1^2} + 2gh = v_2^2 \Rightarrow \\ \Rightarrow 2gh &= v_2^2 - \frac{A_2^2 v_2^2}{A_1^2} \Rightarrow 2gh = v_2^2 (1 - A_2^2/A_1^2) \Rightarrow \\ \Rightarrow v_2^2 &= \frac{2gh}{1 - A_2^2/A_1^2} \Rightarrow v_2 = \sqrt{\frac{2gh}{1 - A_2^2/A_1^2}} \\ &\quad \text{or } A_1 \rightarrow \infty \Rightarrow \frac{A_2}{A_1} \rightarrow 0 \quad \left. \begin{array}{l} v \rightarrow \sqrt{2gh} \\ \text{το οποίο ε Torricelli} \end{array} \right\} \end{aligned}$$

Ροή Venturi / Βερσιμύζο



$$\Pi_1 = \Pi_2 \Rightarrow A_1 v_1 = A_2 v_2 \Rightarrow v_2 = \frac{A_1 v_1}{A_2} \quad (1)$$

$$\begin{aligned} P_2 + \frac{1}{2}\rho v_1^2 + \rho g 0 &= P_1 + \frac{1}{2}\rho v_2^2 + \rho g 0 \Rightarrow \\ P_2 + \frac{1}{2}\rho v_1^2 &= P_1 + \frac{1}{2}\rho v_2^2 \Rightarrow \\ P_{atm} + \rho g h_1 + \frac{1}{2}\rho v_1^2 &= P_{atm} + \rho g h_2 + \frac{1}{2}\rho v_2^2 \Rightarrow \end{aligned}$$

$$\begin{aligned} \Rightarrow gh_1 + \frac{1}{2}v_1^2 &= gh_2 + \frac{1}{2}v_2^2 \xrightarrow{(1)} 2gh_1 + v_1^2 = 2gh_2 + v_2^2 \Rightarrow \\ \Rightarrow 2gh_1 - 2gh_2 &= v_2^2 - v_1^2 \xrightarrow{(1)} 2g(h_1 - h_2) = \frac{A_1^2 v_1^2}{A_2^2} - v_1^2 \Rightarrow \\ \Rightarrow 2g\Delta h &= v_1^2 (A_1^2/A_2^2 - 1) \Rightarrow v_1^2 = \frac{2g\Delta h}{A_1^2/A_2^2 - 1} \Rightarrow \end{aligned}$$

$$\Rightarrow v_1 = \sqrt{\frac{2g\Delta h}{A_1^2/A_2^2 - 1}}$$

