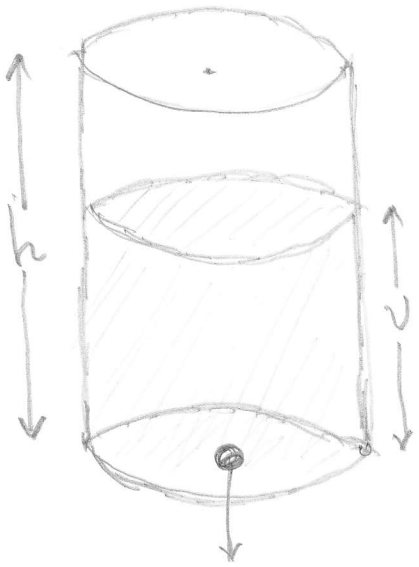

Νόμος Torricelli

$$V'(t) = -a\cdot\sqrt{2g\cdot\upsilon(t)}$$

α διατομή εκροής

$$V(t) = \pi\rho^2\cdot\upsilon(t) \rightsquigarrow V'(t) = \pi\rho^2\upsilon'(t)$$

$$-a\sqrt{2g\upsilon(t)} = \pi\rho^2\upsilon'(t) \rightsquigarrow$$

$$-\pi\rho_1^2\sqrt{2g\cdot\upsilon(t)} = \pi\rho^2\upsilon'(t) \rightsquigarrow \upsilon'(t) = -\left(\frac{\rho_1}{\rho}\right)^2 2\sqrt{5}\sqrt{\upsilon(t)}$$

$$\frac{d\upsilon(t)}{\sqrt{\upsilon(t)}} = -\left(\frac{\rho_1}{\rho}\right)^2 2\sqrt{5}\,dt \rightsquigarrow 2\sqrt{\upsilon(t)} = -\left(\frac{\rho_1}{\rho}\right)^2 2\sqrt{5}t + C$$

$$\upsilon(t) = \left(\frac{C}{2} - \left(\frac{\rho_1}{\rho}\right)^2\sqrt{5}\,t\right)^2$$

για $t=0$ (αρχή) $\rightsquigarrow h = \upsilon(0) = \frac{C^2}{4} \rightarrow \boxed{C = 2\sqrt{h}}$

Άρα $\upsilon(t) = \left[\sqrt{h} - \left(\frac{\rho_1}{\rho}\right)^2\sqrt{5}\,t\right]^2$

$\upsilon(t) = 0 \rightarrow t = \dfrac{\sqrt{h}}{\left(\frac{\rho_1}{\rho}\right)^2\sqrt{5}}$