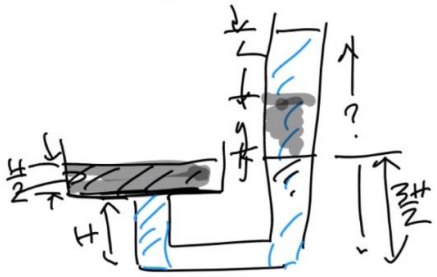


$p_1 = \rho g (2\delta)$
$p_2 = \rho_{oil} g H$
$\delta = \frac{H}{2 \cdot 2}$
$\frac{\rho}{\rho_{oil}} = 1.1$
10% H

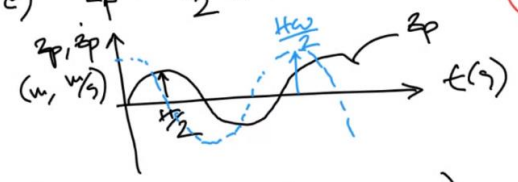
$V_{LEFT} = \frac{H}{2}\left(\frac{\pi D^2}{4}\right) = V_{RIGHT} = y\left(\frac{\pi d^2}{4}\right)$
$\Rightarrow y = \frac{H}{2}\left(\frac{D}{d}\right)^2 = \frac{9H}{2}$



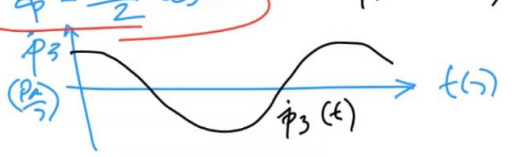
$\Sigma F = 0$
$mg + \rho g H\left(\frac{\pi d^2}{4}\right) g = \rho\left(\frac{3H}{2} + \frac{9H}{2}\right)\frac{\pi d^2}{4} g + \rho_{oil} g H\left(\frac{\pi d^2}{4}\right) g$
$m = \left(\frac{\pi d^2}{4}\right) H (5\rho + \rho_{oil})$

d) $p_3 = \gamma \frac{Q}{A} = \rho g \frac{\left(\frac{\pi D^2}{4}\right)\bar{v}_3}{\frac{\pi d^2}{4}} \Rightarrow p_3 = 9\rho g \bar{v}_3$

e) $z_p = \frac{H}{2}\sin \omega t$

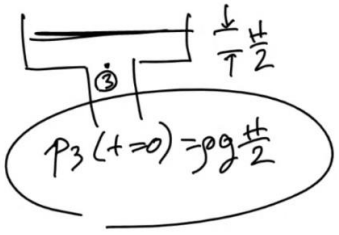


$\dot{z}_p = \frac{H\omega}{2}\cos \omega t$



$p_3 = \text{const.} \cdot \dot{z}_p$

f)



$p_3(t=0) = \rho g \frac{H}{2}$

g) $p_3 = \int \dot{p}_3 dt = \int \underbrace{9\rho g \frac{H\omega}{2}}_{\text{const.}} \cos \omega t \, dt$

$\Rightarrow p_3 = \frac{9}{2}\rho g H \omega \left(\frac{1}{\omega}\sin \omega t + C\right)$

$C = \frac{1}{9\omega} \therefore p_3 = \frac{\rho g H}{2}(9\sin \omega t + 1)$

h) $p_3 + \rho g z_3 + \rho \frac{v_3^2}{2} = p_4 + \rho g z_4 + \rho \frac{v_4^2}{2}$ $\quad v_3 = v_4$

$\Rightarrow p_4 = p_3 + \rho g \underbrace{(z_3 - z_4)}_{H - \frac{1}{2}} \therefore p_4 = \frac{\rho g H}{2}(9\sin \omega t + 1) + \rho g\left(H - \frac{d}{2}\right)$

EC. 1. $2A + B \longrightarrow C$

1^{st} in A
2^{nd} in B

$r = k[A]^1[B]^2$

E.C.2

