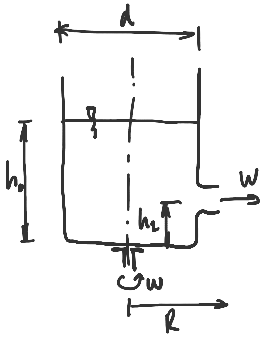


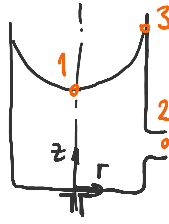
Problem 3-8

2022. április 25., hétfő

14:18



$$\begin{aligned}
 d &= 200 \text{ mm} \\
 h_0 &= 300 \text{ mm} \\
 h_2 &= 50 \text{ mm} \\
 R &= 110 \text{ mm} \\
 w &= 3 \frac{\text{m}}{\text{s}} \\
 \hline
 w &=?
 \end{aligned}$$



BE 1-2

$$\begin{aligned}
 \rho_1 + \frac{\rho w^2}{2} + \rho g z_1 &= \rho_2 + \frac{\rho w^2}{2} + \rho g z_2 \\
 \rho_1 &= \rho_2 \\
 \rho_1 &= \rho_0 \\
 \rho_2 &= \rho_0 \\
 g z_1 &= g z_2 - \frac{w^2 R^2}{2} \\
 z_1 &= h_0 - \frac{\Delta h}{2} = h_0 - \frac{w^2 d^2}{16g}
 \end{aligned}$$

HE 1-3

$$\begin{aligned}
 \rho_1 + \rho g z_1 &= \rho_3 + \rho g z_3 \\
 \rho_1 &= \rho_3 \\
 \rho_1 &= \rho_0 \\
 \rho_3 &= \rho_0 \\
 g z_1 &= g z_3 - \frac{w^2 R^2}{2} \\
 z_3 - z_1 &= \Delta h = \frac{w^2 R^2}{2g} = \frac{w^2 d^2}{8g}
 \end{aligned}$$

$$g \left(h_0 - \frac{w^2 d^2}{16g} \right) = \frac{w^2}{2} + g h_2 - \frac{w^2 R^2}{2}$$

$$w^2 \left(\frac{R^2}{2} - \frac{d^2}{16} \right) = \frac{w^2}{2} + g(h_2 - h_0)$$

$$w = \sqrt{\frac{\frac{w^2}{2} - g(h_2 - h_0)}{\frac{R^2}{2} - \frac{d^2}{16}}} = \underline{\underline{23.73 \frac{\text{m}}{\text{s}}}}$$