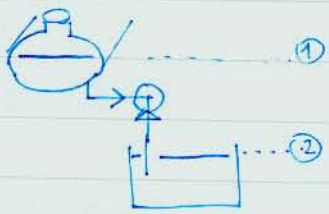
3-17



$v_1 = v_2 \approx 0$

$p_1 = p_2$

$h_1 = 6\ m \quad h_2 = 0$

$\varepsilon = 0.3\ mm$

$\rho = 815\ kg/m^3$

$\eta = 2.45 \cdot 10^{-3}\ Pa\,s$

$L = 48\ m$

$d = 50\ mm$

$V = 40\ m^3$

$h_1 g + e_c = e_{dis}$

$h_1 + e_c/g = e_{dis}/g$

Iteracia 1: $\dot{V} = 6\ dm^3/s \quad v = \frac{\dot{V}}{A} = \frac{6 \cdot 10^{-3}}{0.0019635} = 3.06\ m/s \quad A = \frac{\pi d^2}{4} = 0.0019635\ m^2$

$Re = \frac{3.06 \cdot 0.05 \cdot 815}{2.45 \cdot 10^{-3}} = 50\,896$

$\lambda = 0.25 / \left\{ \log\left[(6.81/Re)^{0.9} + \frac{\varepsilon/d}{3.7} \right] \right\}^2 = 0.034$

$e_{dis}/g = \frac{\lambda L}{d} \frac{v^2}{2g} = 15.59\ m$

$e_c/g = 15.59 - 6 = \underline{\underline{9.59\ m}} \qquad [e_c/g] = 23\ m$

~~$e_{dis}/g \; V =$~~

Iteracia 2: 

Iteracia 2: $\dot{V} = 8\ dm^3/s \quad v = \frac{8 \cdot 10^{-3}}{0.0019635} = 4.0743\ m/s$

$Re = 67\,707$

$\lambda = 0.25 / \left\{ \log\left[(6.81/Re)^{0.9} + \frac{\varepsilon/d}{3.7} \right] \right\}^2 = 0.0336$

$e_{dis}/g = 1.6446\, v^2 = 27.30$

$e_{dis}/g = 27.3 - 6 = \underline{\underline{21.3\ m}} \qquad [21.5]$

$V = 10\ dm^3/s \quad v = 5.09\ m/s$

$e_{dis}/g = 1.6446 v^2 = 42.6$

$= \underline{\underline{36.6\ m}}$

$\underline{\underline{83.3\ min}}$