Ex 6/10

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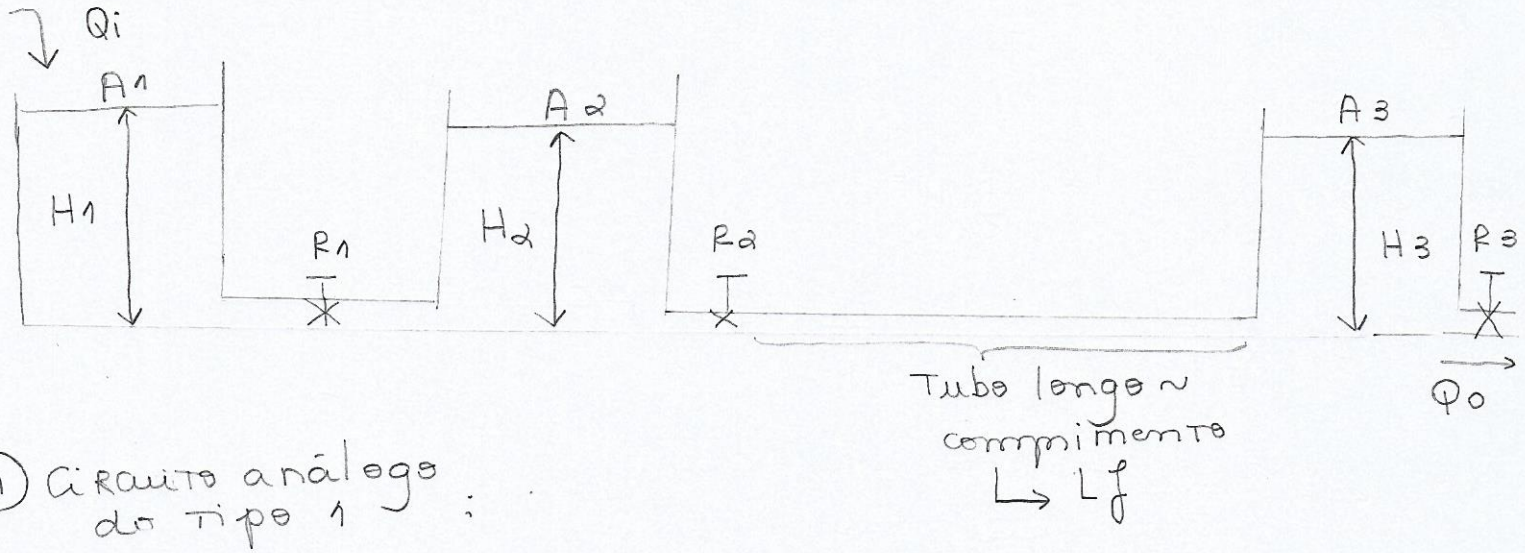
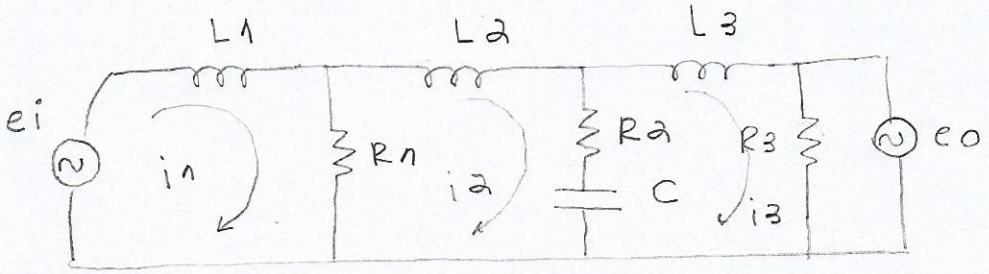


① Circuito análogo do tipo 1 :



▲ Equacionamento :

malha 1 :

$$ei = L_1 D i_1 + R_1 (i_1 - i_2)$$

malha 2 :

$$L_2 D i_2 + R_1 (i_2 - i_1) + R_2 (i_2 - i_3) + \frac{(i_2 - i_3)}{CD} = 0$$

malha 3 :

$$L_3 D i_3 + R_2 (i_3 - i_2) + \overbrace{R_3 (i_3)}^{eo} + \frac{(i_3 - i_2)}{CD} = 0$$

Analogamente :

$$Qi = C_{f_1} D h_1 + \frac{(h_1 - h_2)}{R_1}$$

$$C_{f_2} D h_2 + \frac{(h_2 - h_1)}{R_1} + \frac{(h_2 - h_3)}{R_2} + \frac{(h_2 - h_3)}{L_f D} = 0$$

$$C_{f_3} D h_3 + \frac{(h_3 - h_2)}{R_2} + Qo + \frac{(h_3 - h_2)}{L_f D} = 0$$

▲ onde :

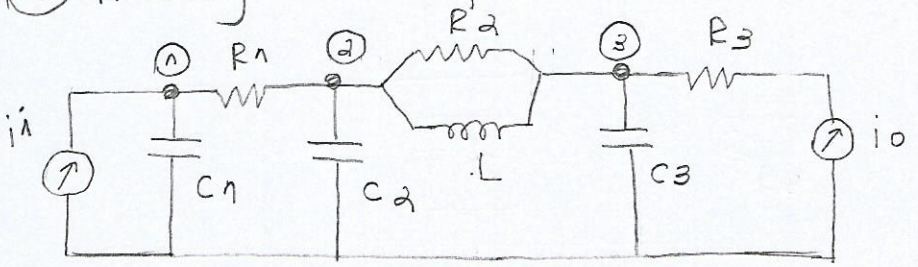
$$C_{f_1} = \frac{A_1}{\rho g}$$

$$C_{f_2} = \frac{A_2}{\rho g}$$

$$C_{f_3} = \frac{A_3}{\rho g}$$

$$L_f = \frac{\rho \cdot l}{a}$$

(2) Analogia do tipo 2



$V_3/R_3 = i_o$

$h_3/R_3 = Q_o$

$$V_1\left(C_1 D + \frac{1}{R_1}\right) - V_2\left(\frac{1}{R_1}\right) = i$$

$$V_2\left(C_2 D + \frac{1}{R_2} + \frac{1}{L\,D}\right) - V_3\left(\frac{1}{R_2} + \frac{1}{L\,D}\right) = 0$$

$$V_3\left(C_3 D + \frac{1}{R_3} + \frac{1}{R_2} + \frac{1}{LD}\right) - V_2\left(\frac{1}{R_2} + \frac{1}{LD}\right) = 0$$

analogamente:

$$h_1\left(C_{f_1} D + \frac{1}{R_1}\right) - h_2\left(\frac{1}{R_1}\right) = Q$$

$$h_2\left(C_{f_2} D + \frac{1}{R_2} + \frac{1}{L_f D}\right) - h_3\left(\frac{1}{R_2} + \frac{1}{L_f D}\right) = 0$$

$$h_3\left(C_{f_3} D + \frac{1}{R_2} + \frac{1}{L_f D}\right) - h_2\left(\frac{1}{R_2} + \frac{1}{L_f D}\right) = -Q_o$$