Nome: Bruno Akira Oshiro NUSP: 10771667 P.1

(1)
$$\begin{cases} J_1 \dot{\omega}_1 + B_1 \omega_1 + T_1 = T_m & (2) \\ J_2 \dot{\omega}_2 + B_2 \omega_2 + T_c = T_2 & (3) \end{cases}$$

- Admitindo $\eta = 1$

$$T_1 \omega_1 = T_2 \omega_2$$

$$T_2 = T_1 \cdot n \quad (4)$$

- Substituindo (4) em (3)

$$J_2 \dot{\omega}_2 + B_2 \omega_2 + T_c = T_1 \cdot n \quad (5)$$

- Pondo (2) em (5)

$$(J_2 \cdot \dot{\omega}_2 + B_2 \omega_2 + T_c)\frac{1}{n} = T_m - (J_1 \dot{\omega}_1 + B_1 \omega_1)$$

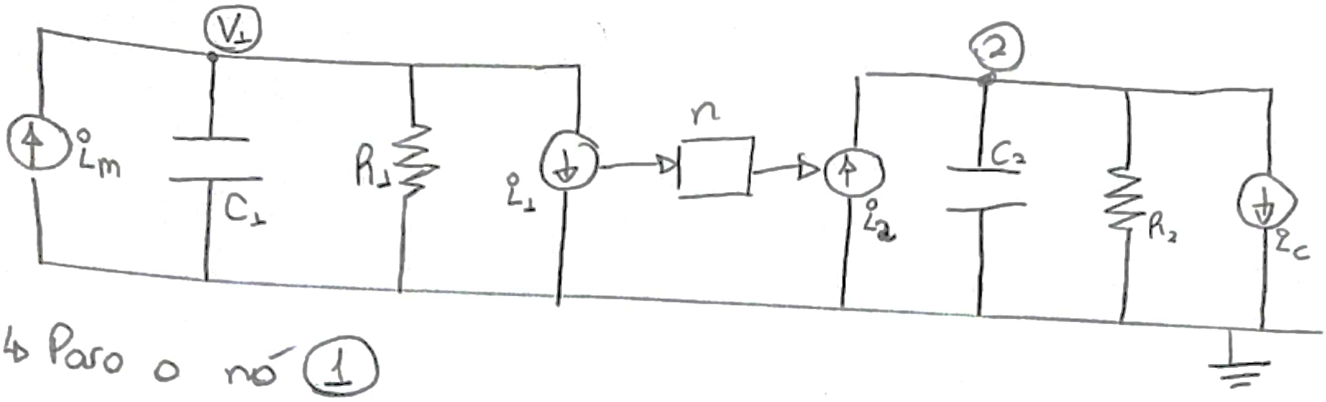
- Sendo $\omega_1 = n \omega_2$

$$J_2 \dot{\omega}_2 + B_2 \omega_2 + T_c = T_m \cdot n - (J_1 \dot{\omega}_2 n^2 + B_1 \omega_2 n^2)$$

$$\boxed{(J_2 + J_1 n^2)\dot{\omega}_2 + (B_2 + B_1 n^2)\omega_2 + T_c = T_m \cdot n}$$

(1) Nome: Bruno Akira Oshiro   NUSP: 10771667   (P.2)

↳ Analogia tipo (2)



↳ Para o nó (1)

$$i_m - V_1\left(C_1 D + \frac{1}{R_1}\right) - i_1 = 0$$

$$\boxed{J_1 \cdot \ddot{\theta} + B_1 \cdot \dot{\theta} = T_m - T_1}$$

↳ Para o nó (2)

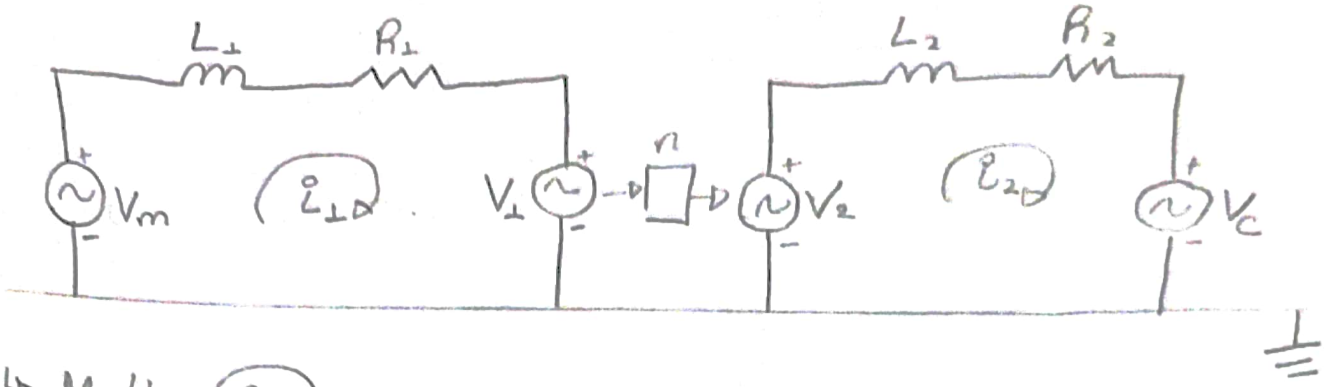
$$i_2 - V_2\left(C_2 D + \frac{1}{R_2}\right) - i_c = 0$$

$$\boxed{J_2 \ddot{\theta} + B_2 \dot{\theta} = T_2 - T_c}$$

↳ Fazendo o procedimento do primeiro exercício

$$\left(J_1 + \frac{J_2}{n^2}\right)\dot{\omega}_1 + \left(B_1 + \frac{B_2}{n^2}\right)\cdot \omega_1 + \frac{T_c}{T_n} = T_m$$

b) → Analogia do Tipo (1) (P.3)



→ Malha (i_1)

$$V_m - V_1 - i_1(L_1 D + R_1) = 0$$

$$\boxed{J_1 \cdot \ddot{\theta}_1 + B_1 \dot{\theta}_1 = T_m - T_1}$$

→ Malha (i_2)

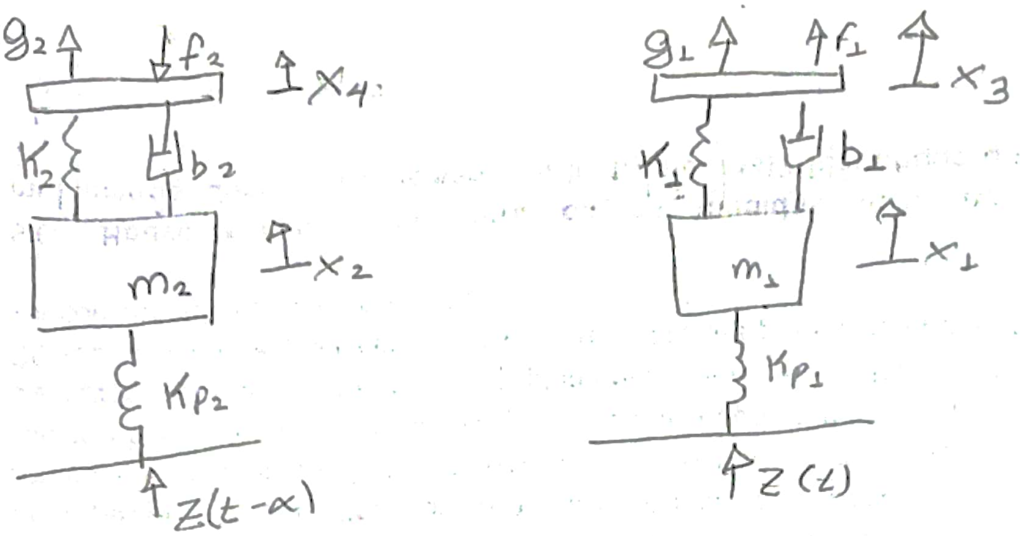
$$V_2 - V_c - i_2(L_2 D + R_2) = 0$$

$$\boxed{J_2 \ddot{\theta}_2 + B_1 \dot{\theta}_2 = T_2 - T_c}$$

→ Realizando o mesmo procedimento do ex 1

$$\left(J_1 + \frac{J_2}{n^2}\right)\dot{\omega}_1 + \left(B_1 + \frac{B_2}{n^2}\right)\omega_1 + \frac{T_c}{T_n} = T_m$$

②

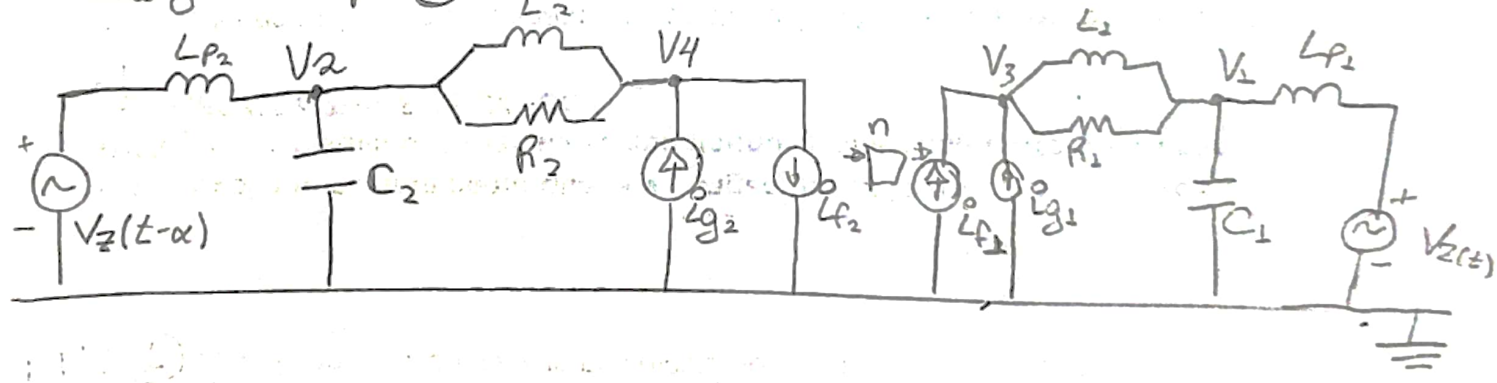


- g_1 e g_2 são forças devido ao movimento vertical
- f_1 e f_2 devido à arfagem
- Como $P_1 = P_2$

$$f_2 \cdot \dot{\Theta} \cdot l_2 = f_1 \dot{\Theta} \cdot l_1$$

$$\frac{l_1}{l_2} = \frac{f_2}{f_1} = n$$

- Analogia tipo ②



↳ Nó 1

$$V_1\left(C_1D+\frac{1}{L_{p1}D}+\frac{1}{L_1D}+\frac{1}{R_1}\right)-V_{z(t)}\frac{1}{L_{p1}}-V_3\left(\frac{1}{L_1D}+\frac{1}{R_1}\right)=0$$

↳ Nó 2

$$V_2\left(C_2D+\frac{1}{L_2D}+\frac{1}{R_2}+\frac{1}{L_{p2}D}\right)-V_{z(t-\alpha)}\cdot\frac{1}{L_{p2}}-V_4\left(\frac{1}{L_2D}+\frac{1}{R_2}\right)=0$$

↳ Nó 3

$$V_3\left(\frac{1}{L_1D}+\frac{1}{R_1}\right)-V_1\left(\frac{1}{L_1D}+\frac{1}{R_1}\right)-i_{f_1}-i_{g_1}=0$$

↳ Nó 4

$$V_4\left(\frac{1}{L_2D}+\frac{1}{R_2}\right)-V_2\left(\frac{1}{L_2D}+\frac{1}{R_2}\right)-i_{g_2}+i_{f_2}=0$$

↳ Substituindo ③ em ①

$$V_1\left(C_1D+\frac{1}{L_{p1}D}\right)-V_{z(t)}\frac{1}{L_{p1}D}=i_{f_1}+i_{g_1}$$

$$m_1\ddot{x}_1+K_1x_1=z_{(t)}x+f_1+g_1$$

↳ Substituindo ④ em ②

$$V_2\left(C_2D+\frac{1}{L_{p2}D}\right)-V_{z(t-\alpha)}\frac{1}{L_{p2}D}=i_{g_2}-i_{f_2}$$

$$m_2\ddot{x}_2+K_2x_2=V_{z(t-\alpha)}\cdot K+g_2-f_2$$

· Com

$$\begin{cases} f_1=b_1(+\dot{\theta}\cdot l_1-\dot{x}_1)+K(\theta l_1-x_1)\\ g_1=b_1(\dot{x}_G-\dot{x}_1)+K(x_G-x_1)\\ f_2=b_1(-\dot{\theta}\cdot l_2-\dot{x}_2)+K(-\theta l_2-x_2)\\ g_2=b_1(\dot{x}_G-\dot{x}_2)+K(x_G-x_2)\end{cases}$$