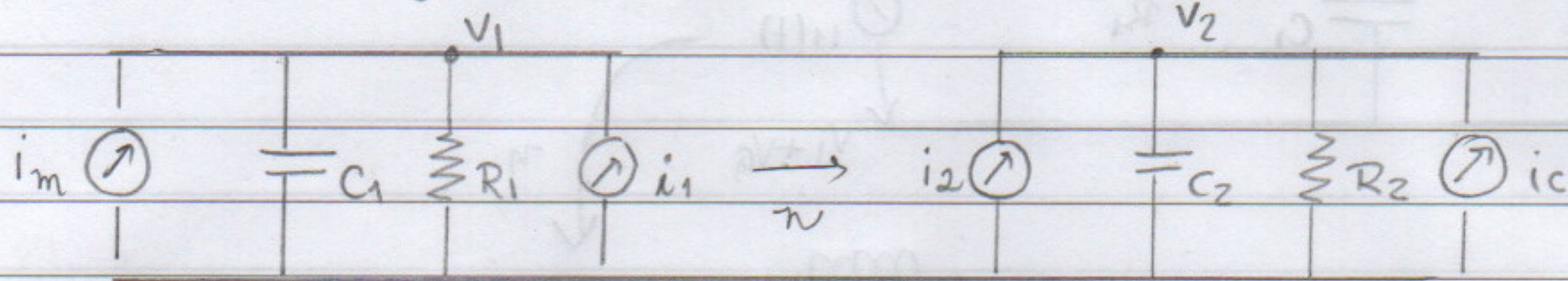


## PME 3380 - EXERCÍCIO AULA 15/09

Gabriela Vasconcelos Araujo - 10771497

1. Por analogia tipo 2:



Pela lei dos nós:

$$\text{nó 1: } \left( C_1 D + \frac{1}{R_1} \right) v_1 = i_m - i_1$$

$$\text{nó 2: } \left( C_2 D + \frac{1}{R_2} \right) v_2 = i_2 - i_c$$

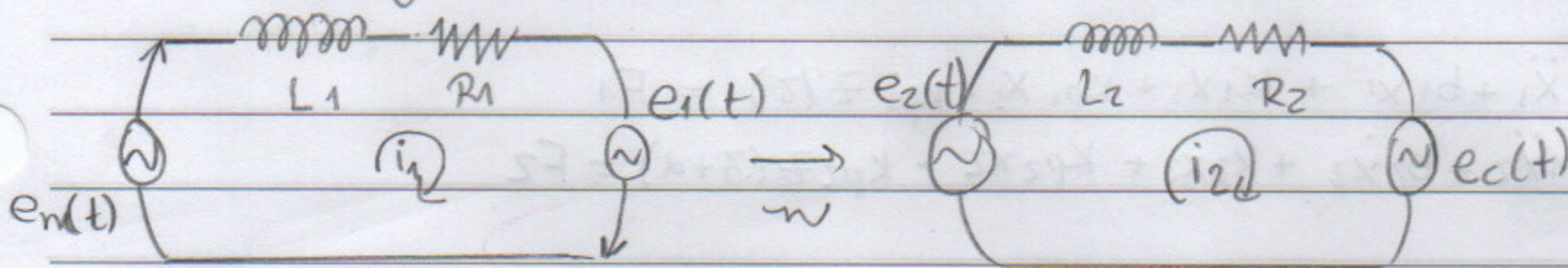
$$\text{no transformador } i_2 = i_1 \eta \Rightarrow \eta = \frac{i_2}{i_1} = \frac{T_2}{T_1}$$

Aplicando a analogia mecânica:

$$(J_1 D + B_1) \omega_1 = T_m - T_1 \quad \left\{ \begin{array}{l} J_1 \ddot{\theta}_1 + B_1 \dot{\theta}_1 = T_m - T_1 \\ J_2 \ddot{\theta}_2 + B_2 \dot{\theta}_2 = T_2 - T_c \end{array} \right.$$

$$(J_2 D + B_2) \omega_2 = T_2 - T_c$$

Por analogia tipo 1:



Pela lei das malhas:

$$(L_1 D + R_1) i_1 + e_1(t) = e_m(t)$$

$$(L_2 D + R_2) i_2 + e_c(t) = e_2(t)$$

$$\text{no transformador } e_2(t) = \eta e_1(t) \Rightarrow \eta = \frac{T_2}{T_1} = \frac{\dot{\theta}_1}{\dot{\theta}_2}$$

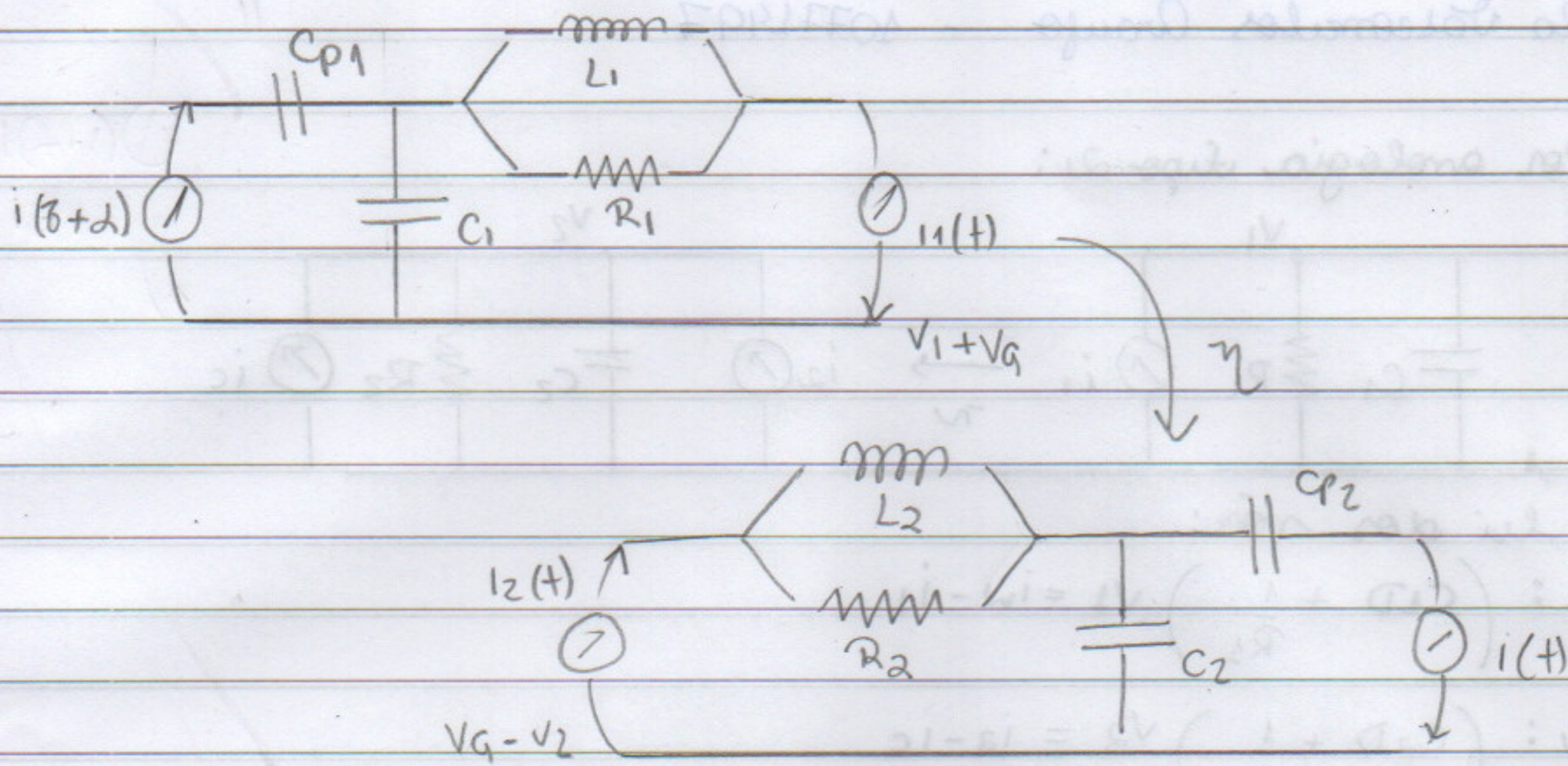
Aplicando a analogia mecânica:

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

$$J_2 \ddot{\theta}_2 + B_2 \dot{\theta}_2 = T_2 - T_c$$



## 2. Circuito elétrico por analogia do tipo 2:



Pela lei dos malhas:

$$\text{malha 1: } i_1 \left( \frac{1}{C_1 D} + \frac{1}{C_{p1} D} + R_1 + L_1 D \right) - i_2(t) \frac{1}{C_{p1} D} = V_G + V_1$$

$$\text{malha 2: } i_2 \left( \frac{1}{C_2 D} + \frac{1}{C_{p2} D} + R_2 + L_2 D \right) - i(t) \frac{1}{C_{p2} D} = V_G - V_2$$

Aplicando a analogia mecânica:

$$m_1 \ddot{x}_1 - M \ddot{x}_1 + b_1 \dot{x}_1 + k_1 x_1 + k_{p1} x_1 - k_{p1} z(t) = F_1$$

$$m_2 \ddot{x}_2 - M \ddot{x}_2 + b_2 \dot{x}_2 + k_2 x_2 + k_{p2} x_2 - k_{p2} z(t+d) = F_2$$