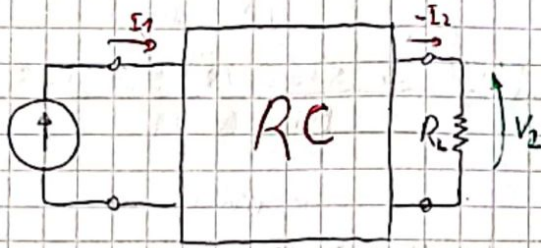


# Tarea Semanal #12

## Ejercicio 5 TP#7



$$V_1 = Z_{11}I_1 + Z_{12}I_2$$

$$V_2 = Z_{21}I_1 + Z_{22}I_2$$

$$\frac{-I_2}{I_1} = H \frac{s^2 + 5s + 4}{s^2 + 8s + 12}$$

$$; Z_{21} = 6H \rightarrow V_2 = 0$$

$$\rightarrow V_{oc} = (-I_2) \cdot R_L$$

$$V_2 = Z_{21} \cdot I_1 + Z_{22} \cdot I_2 \Rightarrow -I_2 \cdot R_L = Z_{21} \cdot I_1 + Z_{22} \cdot I_2 \Rightarrow -I_2 (R_L + Z_{22}) = Z_{21} \cdot I_1$$

$$\frac{-I_2}{I_1} \Big|_{V_{oc} = -I_2 R_L} = \frac{Z_{21}}{R_L + Z_{22}}$$

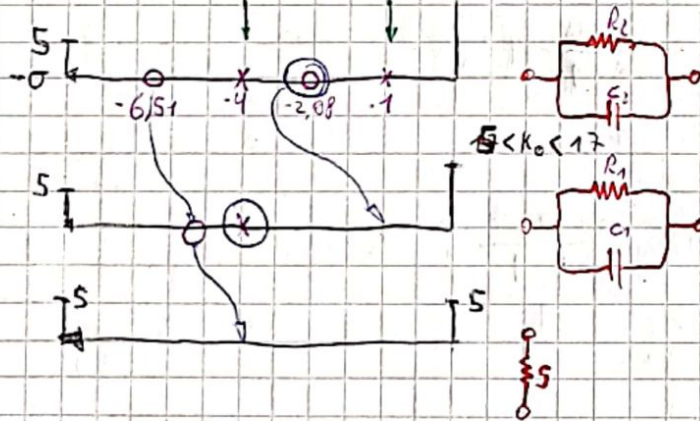
Normalizando por  $R_L$

$$\frac{-I_2}{I_1} (Z_{22} + 1) = Z_{21}$$

$$\Rightarrow Z_{22} = \frac{Z_{21}}{T(s)} - 1 = \frac{6H \cdot (s+6)(s+2)}{H(s+4)(s+7)} - 1 = \frac{5s^2 + 43s + 68}{(s+4)(s+7)} = \frac{5(s+6.07)(s+6.51)}{(s+7)(s+4)}$$

remociones obligatorias

$$68/4 = 17$$



$$\frac{1}{R_L C_2} = 1$$

$$\frac{1}{R_L C_1} = 4$$



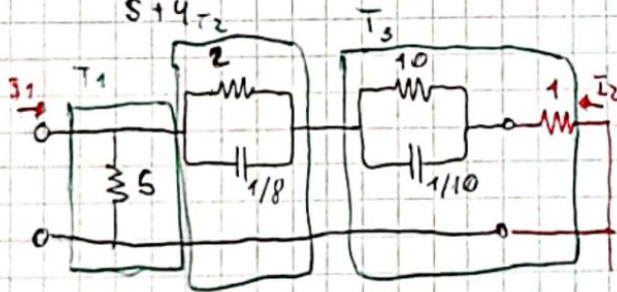


$$Z_{22} = \frac{5s^2 + 43s + 68}{(s+1)(s+4)} \Rightarrow Z_1 = Z_{22} - \frac{k_1}{s+1}; k_1 = \lim_{s \rightarrow -1} Z_{22} \cdot (s+1) = 10$$

$$Z_1 = \frac{5s^2 + 43s + 68 - 10s - 40}{(s+1)(s+4)} = \frac{5s^2 + 33s + 28}{(s+1)(s+4)} = \frac{5s + 28}{s+4}$$

$$Z_2(s) = Z_1(s) - \frac{k_2}{s+4} \Rightarrow k_2 = \lim_{s \rightarrow -4} Z_1(s) \cdot (s+4) = 8$$

$$Z_2(s) = \frac{5s + 28 - 8}{s+4} = 5$$



$$\left. \frac{-I_2}{I_1} \right|_{V_2=0} = \frac{1}{0}$$

$$\begin{matrix} T_1 & & T_2 & & T_3 \\ \begin{bmatrix} 1 & 0 \\ 1/5 & 1 \end{bmatrix} & \begin{bmatrix} 1 & \frac{8}{s+4} \\ 0 & 1 \end{bmatrix} & \begin{bmatrix} 1 & \frac{10}{s+1} \\ 0 & 1 \end{bmatrix} \end{matrix}$$

$$\begin{bmatrix} 1 & \frac{10}{s+1} \\ 1/5 & \frac{8}{(s+4)s} + 1 \end{bmatrix} \begin{bmatrix} 1 & \frac{10}{s+1} \\ 0 & 1 \end{bmatrix} \quad D = \frac{10}{s+1} \cdot \frac{1}{s} + \frac{8}{(s+4)} \cdot \frac{1}{s} + 1 + \frac{1}{s}$$

$$D = \frac{1}{s} \cdot \left( \frac{10}{s+1} + \frac{8}{s+4} + \frac{6}{s} \right) = \frac{1}{s}$$

$$D = \frac{1}{s} \frac{10(s+4) + 8(s+1) + 6(s^2 + 5s + 4)}{(s+1)(s+4)}$$

$$D = \frac{1}{s} \frac{6s^2 + 48s + 32}{s^2 + 5s + 4} = \frac{6}{s} \frac{s^2 + 8s + 12}{s^2 + 5s + 4}$$

$$\left. \frac{-I_2}{I_1} \right|_{V_2=0} = \frac{1}{D} = \frac{1}{\frac{6}{s} \frac{s^2 + 8s + 12}{s^2 + 5s + 4}} = \frac{s}{6} \frac{(s^2 + 5s + 4)}{(s^2 + 8s + 12)}$$