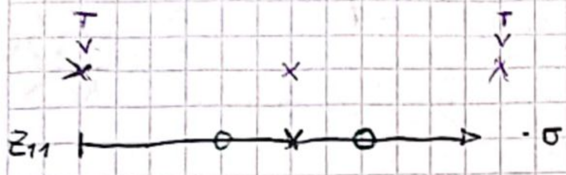
Tarea Semanal #11

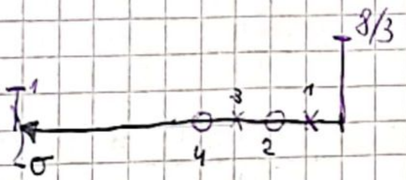
$$T = \frac{V_2}{V_1}\Big|_{I_2=0} = k\,\frac{s+1}{(s+2)(s+4)}$$

$$Z_{11} = \frac{(s+2)(s+4)}{A}\cdot\frac{1}{k}$$

$$Z_{21} = \frac{(s+1)}{A}$$

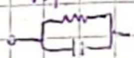


Propongo: $A(s) = (s+3)\cdot(s+1)$ $\qquad Z_{11} = \frac{(s+2)(s+4)}{(s+3)(s+1)}\cdot\frac{1}{k}$



Como $F(0) > F(\infty) \rightarrow Z_{RC}$

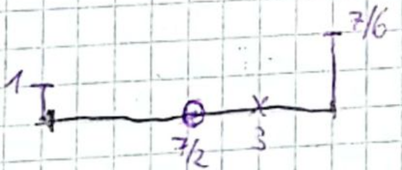
Como Excito con V_1 $\rightarrow$ Arranco en serie



$$Z_1(s) = Z_{11}(s) - \frac{K_1}{s+1} \Rightarrow K_1 = \lim_{s\to -1} Z_{11}\cdot(s+1) = \lim_{s\to -1}\frac{(s+2)(s+4)}{(s+3)} = \boxed{\frac{3}{2}\frac{1}{k}}$$

$$Z_1(s) = \frac{1}{k}\frac{(s+2)(s+4)}{(s+1)(s+3)} - \frac{3/2k}{(s+1)} = \frac{s^2+6s+8-3/2\,s-9/2}{(s+1)(s+3)} = \frac{1}{k}\frac{s^2+9/2\,s+7/2}{(s+3)(s+1)}$$

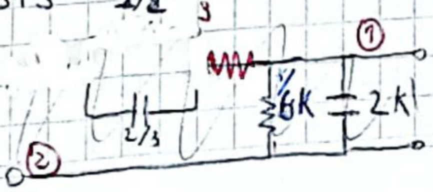
$$Z_1(s) = \frac{1}{k}\frac{(s+7/2)\cancel{(s+1)}}{\cancel{(s+1)}(s+3)} = \frac{1}{k}\frac{(s+7/2)}{(s+3)}$$



$$Z_2 = Z_1(s) - K_\infty \Rightarrow K_\infty = \lim_{s\to\infty} Z_1(s) = \frac{1}{k}$$

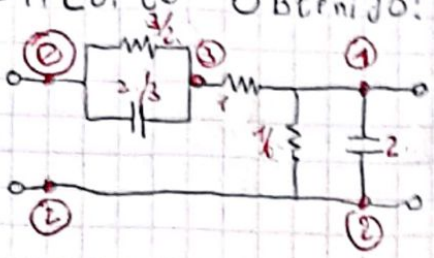
termino en derivación, ¿como mido con I_2?

$$Z_2 = \frac{1}{k}\frac{s+7/2}{s+3} - \frac{s+3}{3/2} = \frac{1}{2k}\frac{1}{s+3} \Rightarrow Y_2 = \frac{1}{Z_2} = k2s + 6k$$



$$\begin{bmatrix} 2/3 + s\,2/3 & -(2/3 + s\,2/3) & 0 \\ -(2/3+s\,2/3) & (6+2s)k + 2/3 + s\,2/3 & -k(6+2s) \\ 0 & -k(6+2s) & (6+2s)k \end{bmatrix}$$

Circuito OBtenido:



MAI

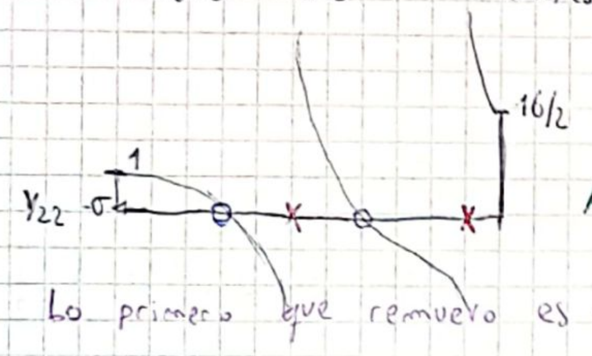
$$\begin{bmatrix} \frac{2}{3}+\frac{s2}{3} & 0 & 0 & -\left(\frac{2}{3}+\frac{s2}{3}\right) \\ 0 & 7+s2 & -(6+s2) & -1 \\ 0 & -(6+s2) & 6+s2 & 0 \\ -\left(\frac{2}{3}+s\frac{2}{3}\right) & -1 & 0 & \frac{5}{3}+\frac{s2}{3} \end{bmatrix}$$

$$Z_{21} = \left.\frac{V_2}{I_1}\right|_{I_2=0}$$

Con parámetros Y:

$$T = \left.\frac{V_2}{V_1}\right|_{I_2=0} = \frac{-Y_{21}}{Y_{22}} = k\,\frac{s+1}{(s+4)(s+4)} \qquad Y_{21} = \frac{s+1}{A}$$

$$Y_{22} = \frac{(s+2)(s+4)}{A} = \left.\frac{I_2}{V_2}\right|_{V_1=0}$$



$$A = (s+3)(s+1/2)$$

Lo primero que remuevo es el elemento de cierre → debo empezar removiendo en derivación

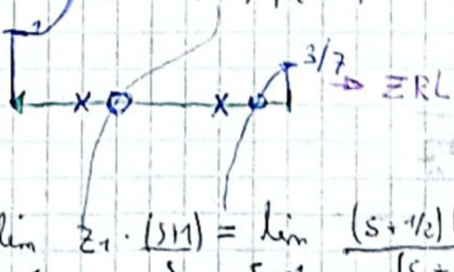
Remuevo polo en $\sigma = 1/2$ para mover el 0 a $\sigma = 1$.

$$Y_1 = Y_{22} - Y_A = Y_{22} - \frac{k_1'}{s+1/2} \qquad y \lim_{s\to -1} Y_1 = 0$$

$$k_1' = \lim_{s\to -1} Y_{22}\cdot(s+1/2) = \frac{(s+2)(s+4)}{(s+3)} = \frac{3}{2}$$

$$Y_1 = \frac{s^2+6s+8-3/2\,s-9/2}{(s+1/2)(s+3)} = \frac{s^2+9/2\,s+7/2}{(s+1/2)(s+3)} = \frac{(s+1)(s+7/2)}{(s+1/2)(s+3)}$$

$$Z_1 = \frac{(s+1/2)(s+3)}{(s+1)(s+7/2)}$$



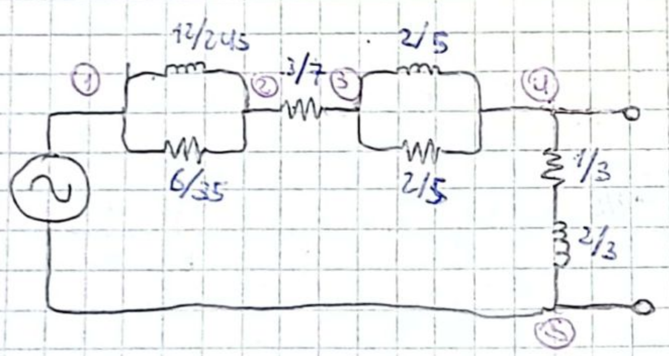
$$Z_2 = Z_1 - \frac{k_2 s}{s+1} \;; \quad k_2 = \lim_{s\to -1} Z_1\cdot\frac{(s+1)}{s} = \lim_{s\to -1}\frac{(s+1/2)(s+3)}{(s+7/2)s} = \frac{2}{5}$$

$$Z_2 = \frac{(s^2 + \frac{7}{2}s) + \frac{3}{2} - \frac{2}{5}s^2 - \frac{7}{5}s}{(s+1)(s+\frac{7}{2})} = \frac{\frac{3}{5}s^2 + \frac{21}{10}s + \frac{3}{2}}{(s+1)\,(s+\frac{7}{2})} = \frac{3}{5}\,\frac{(s+\frac{5}{2})}{(s+\frac{7}{2})}$$

$$Z_3 = Z_2 - k_0 = \frac{3}{5}\,\frac{s+\frac{5}{2}}{s+\frac{7}{2}} - \frac{3}{5}\,\frac{5}{7} = \frac{3}{5}\,\frac{\frac{2}{7}s}{s+\frac{7}{2}} = \frac{6}{35}\cdot\frac{s}{s+\frac{7}{2}}$$

Termino en serie xq exito con ⊗

7/2 ; 5/2 ; 1 ;



Con la MAI → 0 extra en 7/2

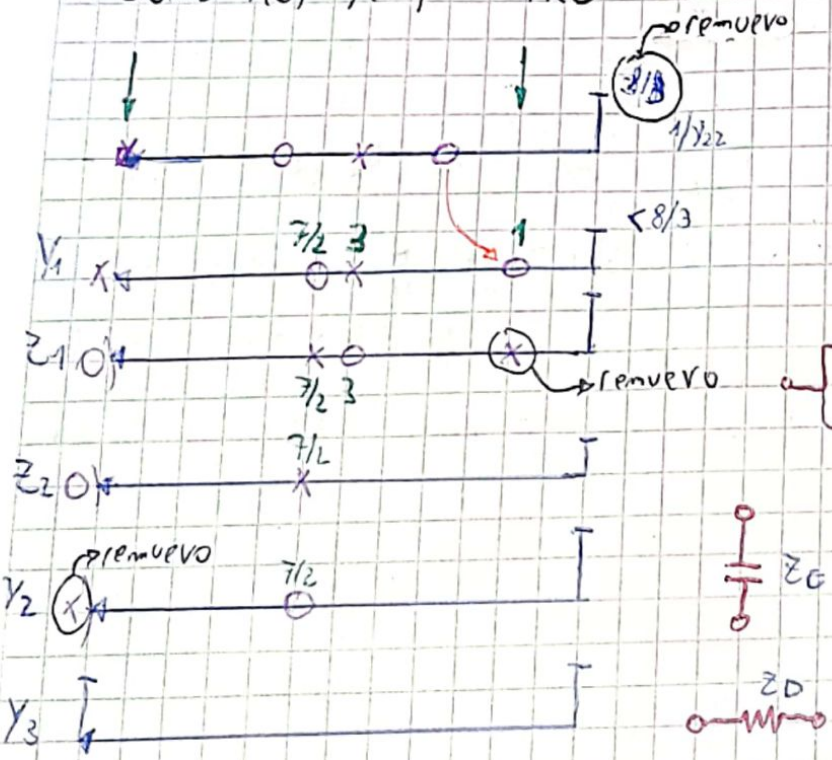
Con parámetros Y

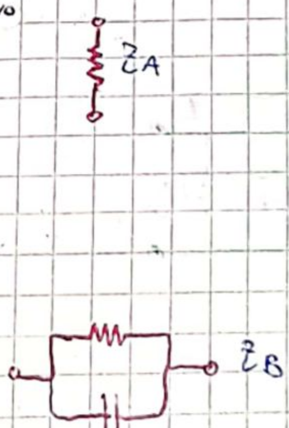
$$T = \frac{V_2}{V_1}\Big|_{I_1=0} = \frac{-y_{21}}{y_{22}} = k\,\frac{s+1}{(s+2)(s+4)} \Rightarrow \quad y_{21} = \frac{s+1}{A}$$

$$y_{22} = \frac{(s+2)(s+4)}{A}$$

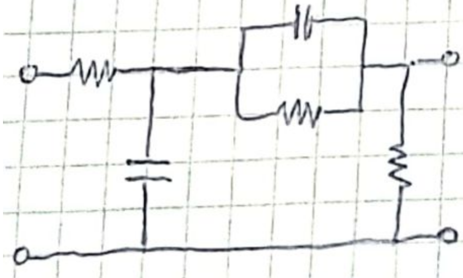
$$A = (s+3)$$

Como $Y(0) < Y(\infty) \rightarrow$ YRC





lo remuevo en serie para respetar la excitación



$$\frac{1}{\frac{1}{R} + sC} = \frac{R}{1+sCR} = \frac{1/C}{\frac{1}{RC}+s}$$

$Y_{22} = \frac{(s+4)(s+2)}{(s+3)}$ $\quad Y_1 = Y_{22} - K_0'$; $\quad K_0' = \lim_{s \to -1} Y_{22} = \frac{3}{2}$

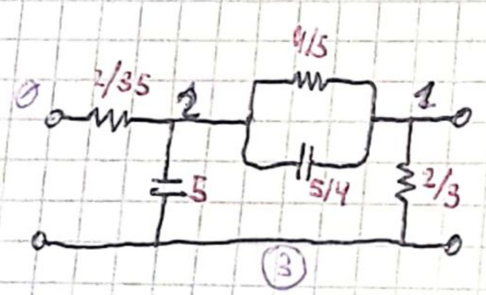
$$Y_1 = \frac{s^2+6s+8-3/2\, s - 9/2}{s+3} = \frac{s^2 + 9/2\, s + 7/2}{s+3} = \frac{(s+1)(s+7/2)}{s+3}$$

$Z_1 = \frac{1}{Y_1} = \frac{s+3}{(s+1)\,(s+7/2)}$ $\quad Z_2 = Z_1 - \frac{K_1}{s+1}$ $\quad K_1 = \lim_{s \to -1} Z_1 \cdot (s+1) = \frac{4}{5}$

$$Z_2 = \frac{s+3 - 4/5\, s - 14/5}{(s+1)\,(s+7/2)} = \frac{1/5\, s - 1/5}{(s+1)\,(s+7/2)} = \frac{1}{5} \cdot \frac{1}{s+7/2}$$

$Y_2 = 5 \cdot (s + 7/2) \Rightarrow 5s \Rightarrow$

$Y_3 = \frac{35}{2} \Rightarrow Z_3 = \frac{2}{35}$



$$\begin{bmatrix} \frac{35}{2} & 0 & -\frac{35}{2} & 0 \\ 0 & \frac{5}{4} + \frac{5s}{4} + \frac{3}{2} & -\left(5/4 + 5/4\, s\right) & -3/2 \\ -35/2 & -\left(5/4 + 5/4\, s\right) & 5s + \frac{35}{2} & -5s \\ 0 & -3/2 & -5s & \frac{3}{2} + 5s \end{bmatrix}$$