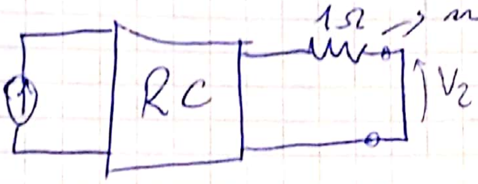
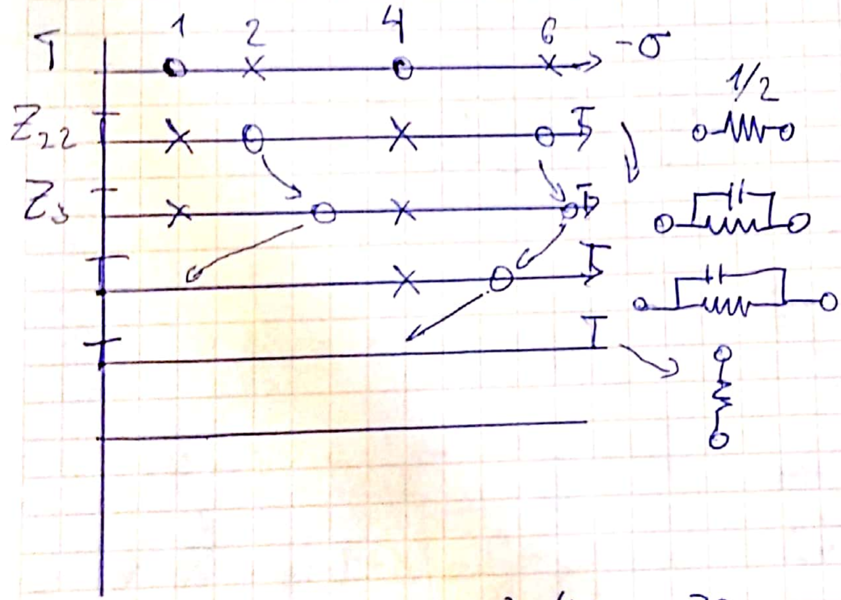
5) $\frac{-I_2}{I_1} = H \, \frac{s^2+5s+4}{s^2+8s+12}$ $\qquad Z_{21} = 6H$

1Ω → no altera Z_{21}



$$\frac{-I_2}{I_1} = \frac{Z_{21}}{Z_{22}} = \frac{6H}{Z_{22}} = H\frac{s^2+5s+4}{s^2+8s+12}$$

$$Z_{22} = 6\,\frac{(s+2)(s+6)}{(s+1)(s+4)} = \frac{6(s^2+8s+12)}{s^2+5s+4}$$



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

$$Z_3 = Z_{22} - 1/2 = \frac{5,5s^2+45,5s+70}{s^2+5s+4}$$

$\cancel{C = 3/10 \quad R_1 = 10/3}$

$$\lim_{s\to -1} Z_3\,(s+1) = 10 \to C = 0,1 \to R = 10$$

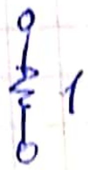
$\cancel{Z_4 = Z_3 - \frac{10/3}{s+1} = \frac{5,5s^2+13/6\,s-10/3}{(s+1)(s+4)} = s - 20/33}$

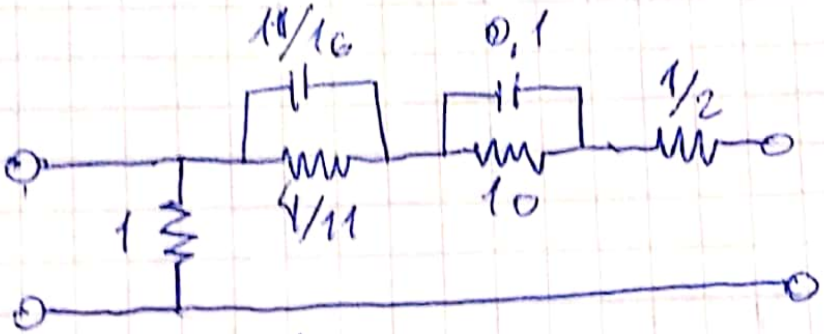
$$Z_4 = Z_3 - \frac{10}{s+1} = \frac{5,5s^2+35,5s+30}{(s+1)(s+4)} = \frac{s+\frac{60}{11}}{s+4}$$

Escaneado con CamScanner

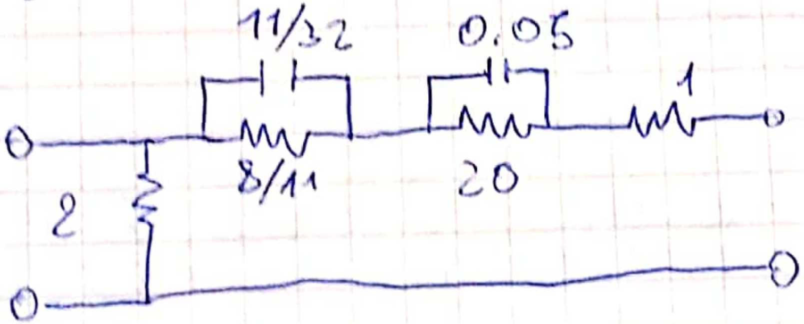
$R + \frac{1}{sC} = \frac{sRC + 1/RC}{s\,1/R}$ $Z_4 = \frac{1}{R_N s C}$ $C_N = R_N C$ $C_N = C/R_N$

$\lim_{s \to -4} (s+4)\, Z_4 = 16/11 \rightarrow C_2 = \frac{11}{16} \quad R_2 = \frac{4}{11}$

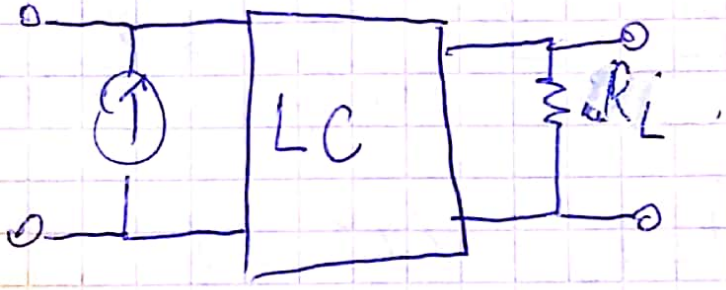
$Z_5 = Z_4 - \frac{16/11}{s+4} = \frac{s+4}{s+4} = 1 \rightarrow$ 



desnormalizo a 2Ω



2)



pensado p/param Z

$$T(s) = \frac{V_2}{I_1} = \frac{s^2+9}{s^3+2s^2+2s+1}$$

$$T \Rightarrow \begin{pmatrix} V_1 \\ I_1 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} \begin{pmatrix} V_2 \\ -I_2 \end{pmatrix}$$

$$V_2 = -R_L I_2$$

$$C = \frac{1}{Z_{21}} \qquad D = \frac{Z_{22}}{Z_{21}}$$

$$\begin{pmatrix} A & B \\ C & D \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ Y_L & 1 \end{pmatrix} \Rightarrow C_T = C + D Y_L$$

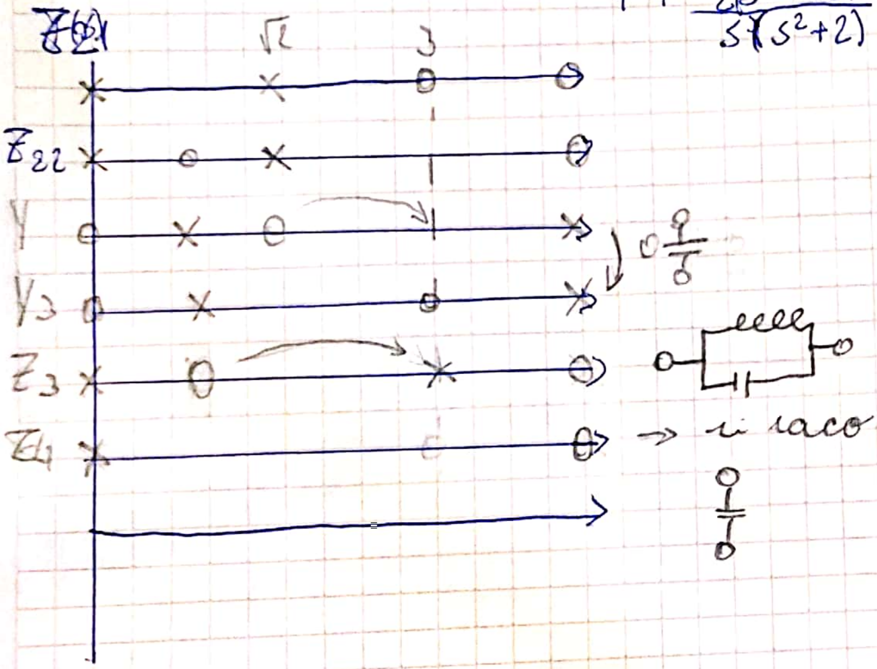
ó

$$\begin{cases} V_1 = Z_{11} I_1 + Z_{12} I_2 \\ V_2 = Z_{21} I_1 + Z_{22} \underbrace{I_2}_{-\frac{V_2}{R_L}} \end{cases} \rightarrow V_2\left(1 + \frac{Z_{22}}{R_L}\right) = I_1 Z_{21} \rightarrow \frac{V_2}{I_1} = \frac{Z_{21}}{1 + Z_{22} Y_L}$$

Normalizo a $R_L = 1$

$$T(s) = \frac{Z_{21}}{1+Z_{22}} = \frac{\overset{far}{s^2+9}}{s^3+2s^2+2s+1} \to$$

$$= \frac{\frac{s^2+9}{s(s^2+2)}}{1+\frac{2(s^2+1/2)}{s(s^2+2)}}$$



→ si saco o-cero no cumplo el 0

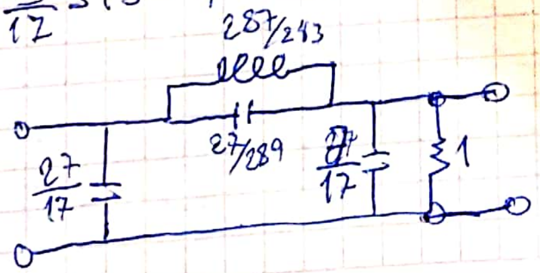
$$\frac{1}{Z_{22}} = \frac{s(s^2+2)}{2(s^2+1/2)} \to k'_\infty = \frac{s^2+2}{2(s^2+1/2)}\Bigg|_{s=j3} = \frac{7}{17} = C_3$$

$$Y_3 = \frac{1}{Z_{22}} - \frac{7}{17}s = \frac{s^3+2s-\frac{14}{17}s^3-\frac{7}{17}s}{2(s^2+1/2)} = \frac{\frac{3}{17}s^3+\frac{27}{17}s}{2(s^2+1/2)} = \frac{\frac{3}{17}s(s^3+9)}{2(s^2+1/2)}$$

$$Z_3 = \frac{2(s^2+1/2)}{\frac{3}{17}(s^2+9)s} \to K = \lim_{s\to j3} \frac{s^2+9}{s} Z_3 = \frac{289}{27} = \frac{1}{C_2}$$

$$L = \frac{289}{243}$$

$$Z_4 = \frac{2s^2+1}{\frac{3}{17}s(s^2+9)} - \frac{s\,\frac{289}{27}}{s^2+9} = \frac{\frac{1}{9}s^2+1}{\frac{3}{17}s(s^2+9)} = \frac{1/9}{\frac{3}{17}s}$$



ch

$$C_1 = \frac{27}{17}$$