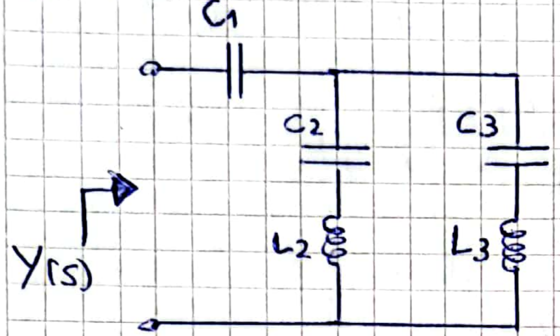
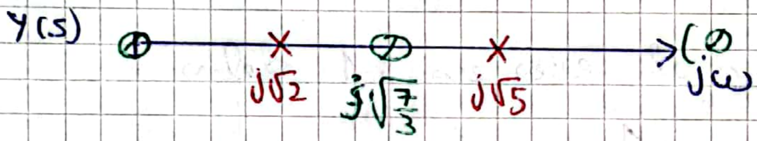
② Sea

$$Y(s) = \frac{3s\left(s^2+\frac{7}{3}\right)}{(s^2+2)(s^2+5)}$$

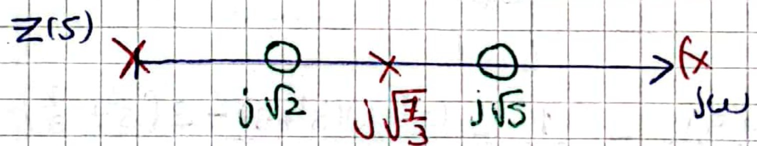
Obtenga los valores de los componentes de la siguiente red sabiendo que L_2 y C_2 resuenan a $1\ \frac{rad}{s}$



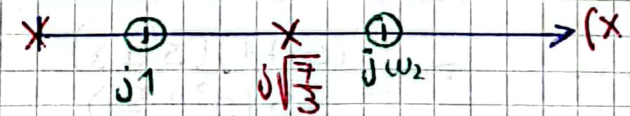
Resonancia serie → mínima impedancia a la frecuencia resonancia → cero en $j\omega_0$ visto desde impedancia



Pasando a impedancia



Se debe realizar una remoción parcial del polo en cero con la finalidad de situar el cero de $j\sqrt{2}$ en $j1$



$$\left. |Z - Z_1| \right|_{s=j\omega_1} = 0$$

$$\left[Z - \frac{K_0}{s} \right]_{s=j\omega_1} = 0$$

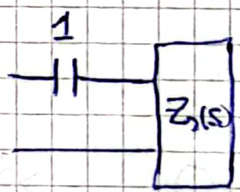
$$K_0 = Z(s) \cdot s \Big|_{s=j1}$$

$$K_0 = \left[\frac{(s^2+2)(s^2+5)}{3\cancel{s}(s^2+\frac{7}{3})} \cdot \cancel{s} \right] \Bigg|_{s=j1}$$

$$K_0 = \frac{(-1+2)(-1+5)}{3(-1+\frac{7}{3})} = 1 \quad //$$

Entonces, para fijar el cero en $j1$ debo remover

$$\frac{K_0}{s} = \frac{1}{s} \Rightarrow$$

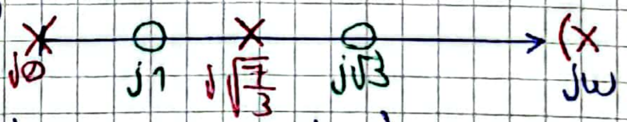


$$Z_2(s) = \frac{(s^2+2)(s^2+5)}{3s(s^2+\frac{7}{3})} - \frac{1}{s} = \frac{(s^2+2)(s^2+5) - 3(s^2+\frac{7}{3})}{3s(s^2+\frac{7}{3})}$$

$$Z_2(s) = \frac{s^4 + 7s^2 + 10 - 3s^2 - 7}{3s^3 + 7s}$$

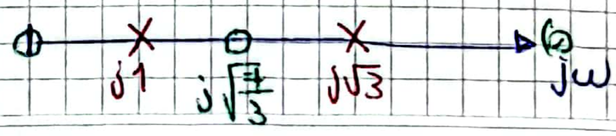
$$Z_2(s) = \frac{s^4 + 4s^2 + 3}{3s^3 + 7s} = \frac{(s^2+1)(s^2+3)}{3s(s^2+\frac{7}{3})}$$

$Z_2(s)$



Pasando a una admitancia

$Y_2(s)$



$$Y_2(s) = \frac{3s\left(s^2+\frac{7}{3}\right)}{(s^2+1)(s^2+3)} = \frac{2k_1 s}{(s^2+1)} + \frac{2k_2 s}{(s^2+3)}$$

Donde

$$2k_1 = \lim_{s^2 \to -1} \frac{\cancel{(s^2+1)}}{\cancel{s}} \frac{3\cancel{s}\left(s^2+\frac{7}{3}\right)}{\cancel{(s^2+1)}(s^2+3)} = \frac{3\left(-1+\frac{7}{3}\right)}{(-1+3)} = \frac{-3+7}{-1+3}$$

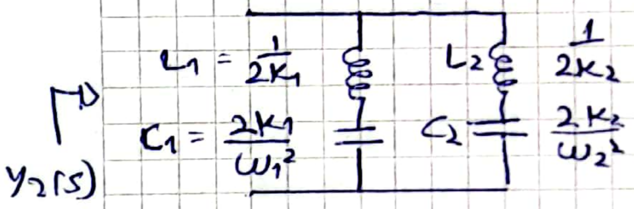
$$2k_1 = \frac{4}{2} = 2$$

y

$$2k_2 = \lim_{s^2 \to -3} \frac{\cancel{(s^2+3)}}{\cancel{s}} \frac{3\cancel{s}\left(s^2+\frac{7}{3}\right)}{(s^2+1)\cancel{(s^2+3)}} = \frac{3\left(-3+\frac{7}{3}\right)}{(-3+1)} = \frac{(-9+7)}{(-3+1)}$$

$$2k_2 = \frac{-2}{-2} = 1$$

Por Foster paralelo



$\Rightarrow$ $L_1 = \frac{1}{2}$; $C_1 = 2$

$L_2 = 1$; $C_2 = \frac{1}{3}$

Finalmente