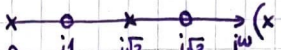
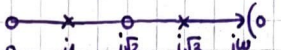
① $Z(s) = \dfrac{(s^2+3)(s^2+1)}{s(s^2+2)}$



② $Y(s) = \dfrac{s(s^2+2)}{(s^2+3)(s^2+1)}$



No hay $\frac{k_0}{s}$ ni $k_\infty \cdot s$

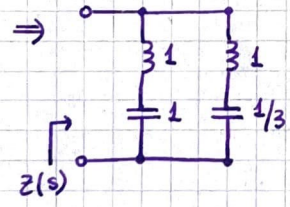
Y tonque $= \dfrac{2 \cdot k \cdot s}{s^2+\omega^2} \rightarrow \lim_{s^2 \to \omega^2} Y(s) = \lim_{s^2 \to \omega^2} \dfrac{2k \cdot s}{s^2+\omega^2} \rightarrow 2k = \lim_{s^2 \to j\omega^2} Y(s) \cdot \dfrac{(s^2+\omega^2)}{s}$

$2k_1 = \lim_{s^2 \to -1} \dfrac{s(s^2+2)}{(s^2+3)(s^2+1)} \cdot \dfrac{(s^2+1)}{s} = \lim_{s^2 \to -1} \dfrac{(s^2+2)}{(s^2+3)} = \dfrac{-1}{-2} = \dfrac{1}{2}$

$2k_2 = \lim_{s^2 \to -3} \dfrac{s(s^2+2)}{(s^2+3)(s^2+1)} \dfrac{(s^2+3)}{s} = \lim_{s^2 \to -3} \dfrac{(s^2+2)}{(s^2+1)} = \dfrac{-1}{-2} = \dfrac{1}{2}$

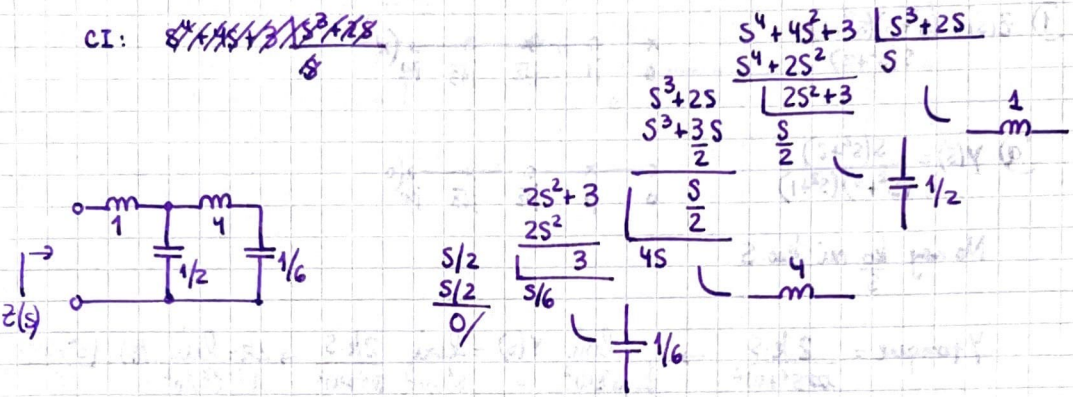
$\dfrac{2k \cdot s}{s^2+\omega^2} = \dfrac{1}{\frac{s}{2k} + \frac{\omega^2}{2ks}} \rightarrow L: \dfrac{1}{2k} \quad C: \dfrac{2k}{\omega^2} \rightarrow \begin{matrix} L_1 = 1 & C_1 = 1 \\ L_2 = 1 & C_2 = \frac{1}{3} \end{matrix}$

$\Rightarrow$

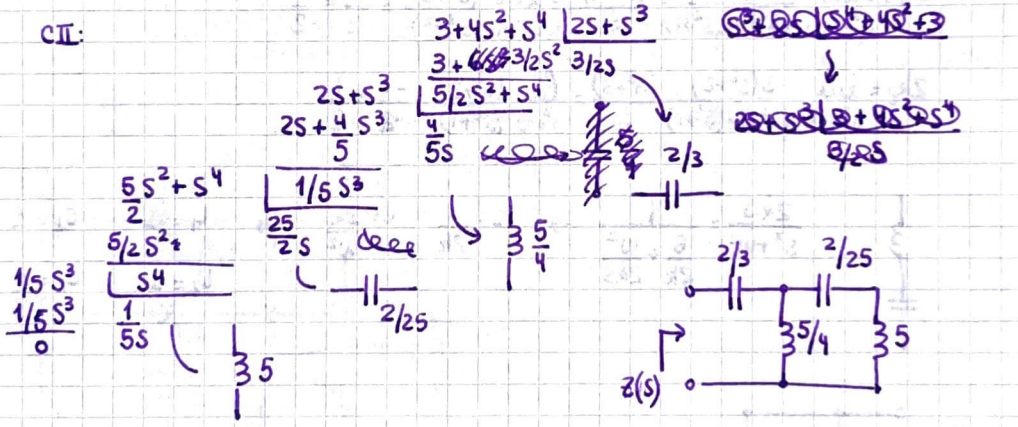


b) $Z(s) = \frac{(s^2+3)(s^2+1)}{s(s^2+2)} = \frac{s^4+4s^2+3}{s^3+2s}$

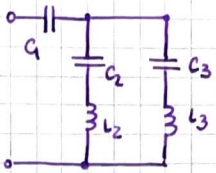
CI:



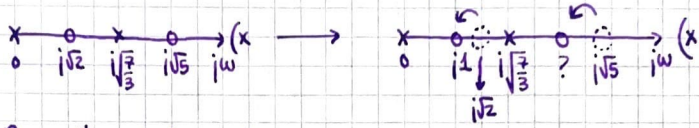
CII:



② $Y(s) = \dfrac{3s(s^2+7/3)}{(s^2+2)(s^2+5)}$



$Z(s) = \dfrac{(s^2+2)(s^2+5)}{3s(s^2+7/3)}$



Remoción parcial para C_1:

$k_0' = Z(s)\cdot s\Big|_{s=j1} = \dfrac{(s^2+2)(s^2+5)}{3(s^2+7/3)}\Big|_{s=j1}$

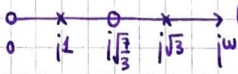
$k_0' = \dfrac{(1)(4)}{3(4/3)} = 1 \rightarrow C_1 = 1$

~~$Z_2(s) = \dfrac{s^4+7s^2+10}{3s^3+7s} - \dfrac{1}{s} = s^4+7s^2+10-$~~

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

$= \dfrac{s^4+7s^2+10-3s^2-7}{3s(s^2+7/3)} = \dfrac{s^4+4s^2+3}{3s(s^2+7/3)} = \dfrac{(s^2+1)(s^2+3)}{3s(s^2+7/3)}$

$Y_2(s) = \dfrac{3s(s^2+7/3)}{(s^2+1)(s^2+3)}$



$\lim_{s^2\to -1} \dfrac{2k_1 \cdot s}{s^2+1} = \lim_{s^2\to -1} Y_2(s) \rightarrow 2k_1 = \lim_{s^2\to -1} Y_2(s)\,\dfrac{(s^2+1)}{s}$

$2k_1 = \lim_{s^2\to -1} \dfrac{3(s^2+7/3)}{(s^2+3)} = \dfrac{3\cdot(-1+7/3)}{(-1+3)} = \dfrac{4}{2} = 2$

$2k_2 = \lim_{s^2\to -3} \dfrac{3(s^2+7/3)}{(s^2+1)} = \dfrac{3(-3+7/3)}{(-3+1)} = \dfrac{-2}{-2} = 1$

$L_1 = \dfrac{1}{2k_1} = \dfrac{1}{2} \qquad C_1 = \dfrac{2k_1}{\omega_1^2} = 2$

$L_2 = \dfrac{1}{2k_2} = 1 \qquad C_2 = \dfrac{2k_2}{\omega_2^2} = \dfrac{1}{3}$