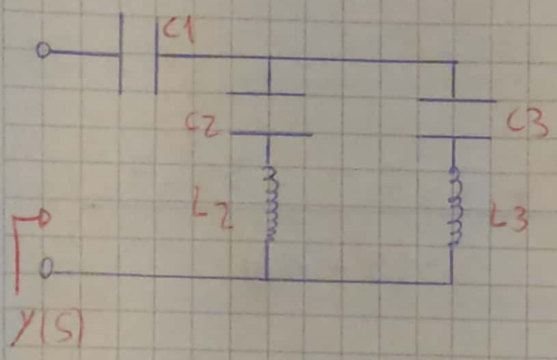
2)

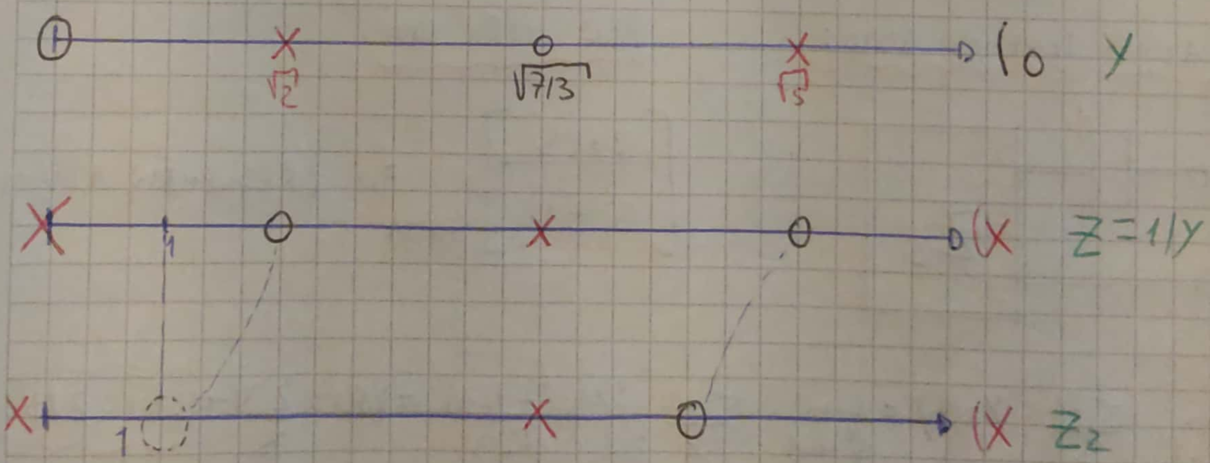
$$Y(S) = \frac{3S(S^2+7/3)}{(S^2+2)(S^2+5)}$$

PARTIENDO DE:



L2 Y C2 A 1 rad/seg

$$K_0 = \lim_{S \to 0} \frac{Y(S)}{S} = \frac{3\cancel{S}(S^2+7/3)}{\cancel{S}(S^2+2)(S^2+5)} \rightarrow K_0 = 7/10 \rightarrow \text{NO ME SIRVE}$$



→ REMOVEMOS PARTE DEL POLO

$Z_2 = \frac{1}{Y} - Z_1$; $\left[\frac{1}{Y} - Z_1\right]_{S=J1} = 0 \rightarrow \left[Z - \frac{K_0}{S}\right]_{S=J1} = 0 \Rightarrow$

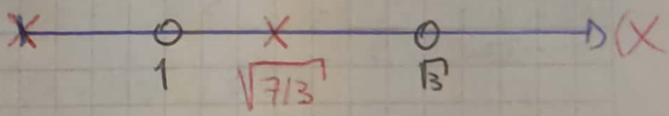
$\Rightarrow K_0 = [Z \cdot S]_{S=J1}$; $Z = \frac{(S^2+2)(S^2+5)}{3S(S^2+7/3)}$

$K_0 = \left[\frac{\cancel{S}\cdot(S^2+2)(S^2+5)}{3\cancel{S}(S^2+7/3)}\right]_{S=J1} \rightarrow K_0 = \frac{10}{10} \rightarrow K_0 = 1$

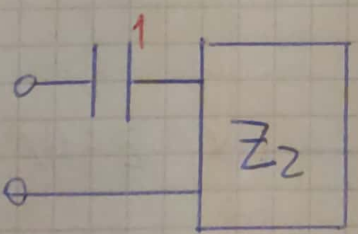
$Z_2 = \frac{(S^2+2)(S^2+5)}{3S(S^2+7/3)} - \left(+\frac{1}{S}\right) = \frac{S^4 + 7S^2 + 10 - 3S^2 - 7}{3S(S^2+7/3)}$

$Z_2(S) = \frac{S^4 + 4S^2 + 3}{3S(S^2+7/3)} \rightarrow$

POLOS Y CEROS $(Z_2(S))$



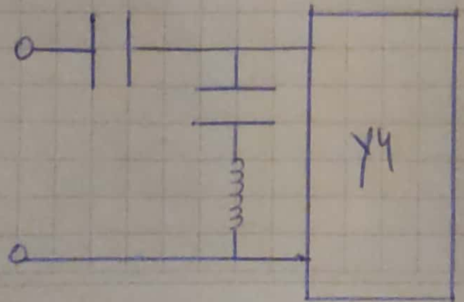
HASTA AHORA TENEMOS ESTO:



POR OTRO LADO:

$\left[\frac{2K_1S}{S^2+1}\right]_{S=J1} = 0$ (RESUENEN A $W_0=1$)

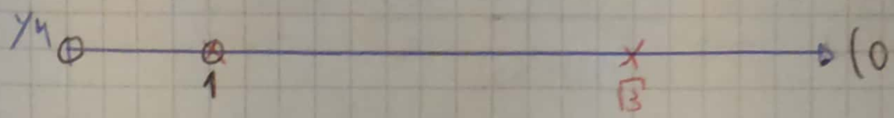
$2K_1 = \lim_{S^2\to -1} \frac{S^2+1}{S} Y_2(S) = \lim_{S^2\to -1} \frac{\cancel{S^2+1}}{\cancel{S}} \frac{3\cancel{S}(S^2+7/3)}{\cancel{(S^2+1)}(S^2+3)} \Rightarrow 2K_1 = \frac{2\cdot 3}{3} \rightarrow 2K_1 = 2$



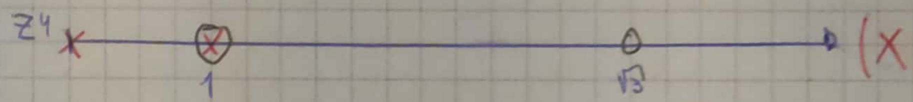
; $Y_4 = Y_2 - \frac{2K_1S}{S^2+1}$; $Y_4 = \frac{3S(S^2+7/3)}{(S^2+1)(S^2+3)} - \frac{2S}{S^2+1}$

Escaneado con CamScanner

$$Y_4 = \frac{3s^3 + 7s - 2s^3 - 6s}{(s^2+1)\cdot(s^2+3)} \rightarrow Y_4 = \frac{s^3+s}{(s^2+1)(s^2+3)} = \frac{s\cancel{(s^2+1)}}{\cancel{(s^2+1)}(s^2+3)}$$



$$Z_4 = 1/Y_4 = \frac{\cancel{(s^2+1)}(s^2+3)}{s\cancel{(s^2+1)}} = \frac{(s^2+3)}{s}$$



$$Z_4 = \frac{K_0}{s} + K_\infty \cdot s \; ; \; K_0 = \lim_{s\to 0} Z_4(s)\cdot s = \lim_{s\to 0} \frac{\cancel{(s^2+1)}(s^2+3)\cancel{s}}{\cancel{s}\cancel{(s^2+1)}} = 3$$

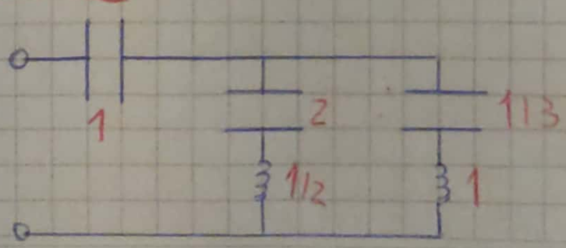
$$K_0 = 3$$

$$K_\infty = \lim_{s\to\infty} \frac{Z(s)}{s} = \lim_{s\to\infty} \frac{(s^2+3)}{s^2} \Rightarrow K_\infty = 1$$

$$Z_4(s) = \frac{1}{\frac{1}{3}s} + s \; ; \; \frac{2K_1 s}{s^2+1} = \frac{2s}{s^2+1} = \frac{1}{\underbrace{s\cdot\frac{1}{2}}_{sL} + \underbrace{\frac{1}{2s}}_{\frac{1}{sC}}} = Y_3(s)$$

$$Y_2(s) = Y_3(s) + Y_4(s) \; ; \; Z_3(s) = \frac{s^2+1}{2s} \Rightarrow Z_3(s) = \frac{1}{2}s + \frac{1}{2s}$$

CIRCUITO



VERIFICACIÓN:

$$Z_3(s_1) = \frac{1}{2}s_1 + \frac{1}{2s} = \frac{1}{2}s - \frac{1}{2}s = 0$$

OTRA FORMA DE CALCULAR $Z4(s)$:

$$\frac{2K2\,s}{s^2+3} = Y4(s) = 1/Z4(s)$$

$$2K2 = \lim_{s \to -3} Y2(s)\,\frac{s^2+3}{s} = \lim_{s \to -3} \frac{3\cancel{s}(s^2+7/3)}{(s^2+1)\cancel{(s^2+3)}}\,\frac{\cancel{s^2+3}}{\cancel{s}} \Rightarrow \boxed{2K2 = 1}$$

$$Z4(s) = \frac{s^2+3}{s} \rightarrow Z4(s) = s + \frac{1}{\frac{1}{3}s} \rightarrow \text{MAS RAPIDO}$$