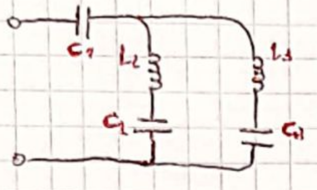
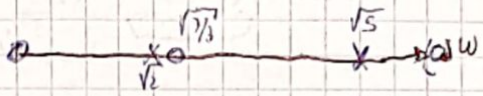
Ejercicio 2:

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





- L_2 y C_2 resuenan a 1 rad/s, para tener una singularidad en ese punto solo puedo remover una parte del polo en el origen y así ubicar la singularidad de $j\omega=\sqrt{2}$ en 1

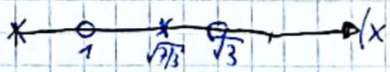
$$Z(s) = \frac{1}{Y(s)} = \frac{(s^2+5)(s^2+2)}{3s(s^2+7/3)}$$

$$Z_2(s) = Z(s) - \frac{k_0'}{s} \quad ; \quad \lim_{s^2\to -1} Z_2(s) = 0 \Rightarrow \lim_{s^2\to -1}\left[Z(s) - \frac{k_0}{s}\right] = 0$$

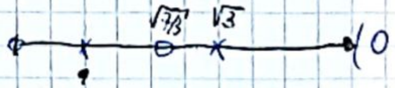
$$k_0' = \lim_{s^2\to -1} Z(s)s = \lim_{s^2\to -1}\frac{(s^2+5)(s^2+2)}{3(s^2+7/3)} = 1$$

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

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



$$Y_2(s) = \frac{1}{Z_2(s)} = \frac{3s(s^2+7/3)}{(s^2+1)(s^2+3)}$$



$$Y_3(s) = Y_2(s) - \frac{2k_1 s}{s^2+1} \rightarrow 2k_1 = \lim_{s^2\to -1} Y_2(s)\cdot\frac{(s^2+1)}{s} = 2$$

$$Y_3(s) = Y_2(s) - \frac{2k_1 s}{s^2+1} = \frac{3s^3+7s}{(s^2+1)(s^2+3)} - \frac{2s}{s^2+1} = \frac{3s^3+7s-2s^3-6s}{(s^2+1)(s^2+3)} = \frac{s^3+s}{(s^2+1)(s^2+3)}$$

$$Y_3(s) = \frac{s\cancel{(s^2+1)}}{\cancel{(s^2+1)}(s^2+3)} = \frac{s}{s^2+3}$$

Escaneado con CamScanner

$$Y(s) = \frac{k_0'}{s} + \frac{1}{\frac{2k_1 s}{s^2+1} + Y_3(s)} = \frac{1}{s} + \frac{1}{\frac{2s}{s^2+1} + \frac{s}{s^2+3}}$$

$$Y(s) = \underbrace{\frac{1}{s1}} + \frac{1}{\underbrace{\frac{1}{s\frac{1}{2} + \frac{1}{2s}}} + \underbrace{\frac{1}{s + \frac{1}{s\frac{1}{3}}}}}$$