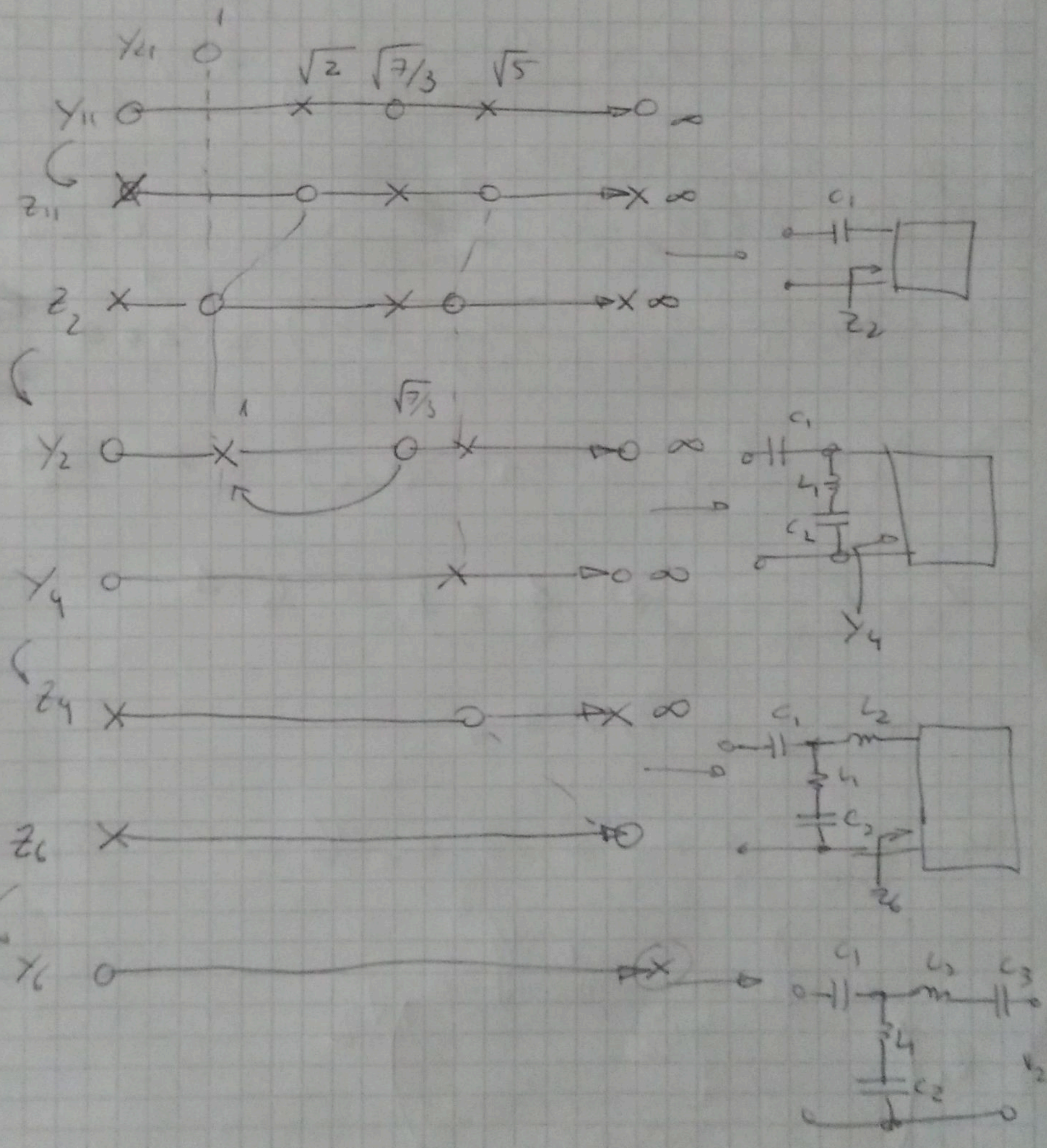
①

$$Y_{11} = \frac{I_1}{V_1}\Bigg|_{V_2=0} = \frac{3s\left(s^2+7/3\right)}{(s^2+2)(s^2+5)}$$

$$Y_{21} = \frac{I_2}{V_1}\Bigg|_{V_2=0} = \frac{s\left(s^2+1\right)}{(s^2+2)(s^2+5)}$$



Sintesi and Pie

$$Z_{11} = \frac{(s^2+2)(s^2+5)}{3s(s^2+7/3)}$$

$$K_1 = \lim_{s^2 \to -1} Z_{11} \cdot s = \frac{(1)(4)}{4} = 1 \qquad C_1 = 1$$

$$Z_2 = Z_{11} - \frac{1}{s} \Rightarrow Z_2 = \frac{(s^2+1)(s^2+3)}{3s(s^2+7/3)} \Rightarrow Y_2 = \frac{3s(s^2+7/3)}{(s^2+1)(s^2+3)}$$

$$\cancel{2K_1 = \lim_{s^2 \to -1} \frac{(s^2+1)(s^2+3)}{3s(s^2+7/3)} \frac{1}{(s^2+1)}}$$

$$L_1 = \frac{1}{2K_1\omega_0} \qquad C_1 = \frac{\omega_0}{2K_2}$$

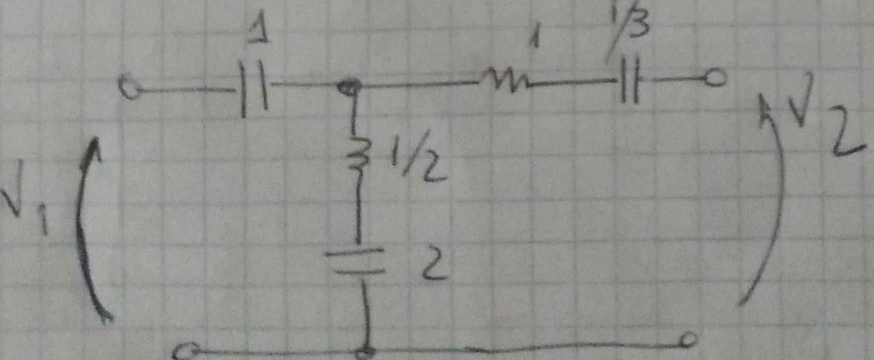
$$2K_1 = \lim_{s^2 \to -1} \frac{3s(s^2+7/3)}{\cancel{(s^2+1)}(s^2+3)} \frac{\cancel{(s^2+1)}}{s} = 2$$

$$Y_4 = Y_2 - \frac{2}{(s^2+1)} \Rightarrow Y_4 = \frac{s}{(s^2+3)} \Rightarrow Z_4 = \frac{s^2+3}{s}$$

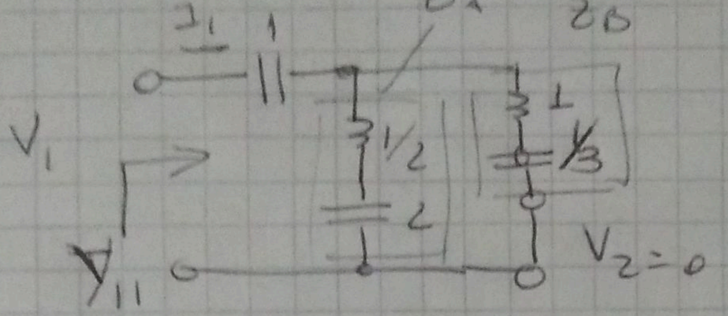
$$K_\infty = \lim_{s \to \infty} \frac{(s^2+3)}{s} \frac{1}{s} = 1 \Rightarrow L_2 = 1$$

$$Z_6 = Z_4 - \frac{1}{s} \Rightarrow Z_6 = \frac{3}{s} \Rightarrow$$

$$K_0 = \lim_{s \to 0} \frac{3}{s} s = 3 \Rightarrow C_3 = 1/3 \Rightarrow$$



Verificación



$$\left.\frac{V_1}{I_1}\right|_{V_2=0} = Z_1 + \frac{1}{(Y_A+Y_B)} = \frac{1}{s} + \frac{1}{\frac{s}{(s^2+3)} + \frac{2s}{(s^2+1)}}$$

$$Z_{11} = \frac{(s^2+2)(s^2+5)}{s(3s^2+7)}$$

$\cancel{Y_{21}=}$

$$Y_{11} = \frac{s(3s^2+7)}{(s^2+2)(s^2+5)} \quad ✓$$

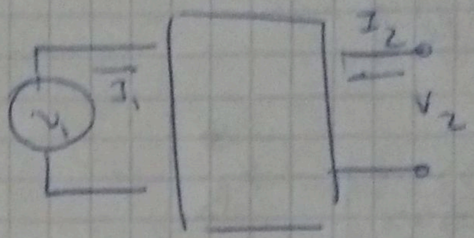
$$Y_{21} = \left.\frac{I_2}{V_1}\right|_{V_2=0} = \frac{\frac{Y_B}{Y_A+Y_B} I_1}{\underbrace{Z_{11}\, I_1}_{V_1}} \Rightarrow Y_{21} = \frac{\frac{Y_B}{Y_A+Y_B}}{Z_{11}}$$

$$Y_{21} = \frac{\dfrac{\frac{s}{s^2+3}}{\frac{s}{s^2+3} + \frac{2s}{s^2+1}}}{\dfrac{(s^2+2)(s^2+5)}{s(3s^2+7)}}$$

Resuelto por Soft.

$$Y_{21} = \frac{s(s^2+1)}{(s^2+2)(s^2+5)} \quad ✓$$

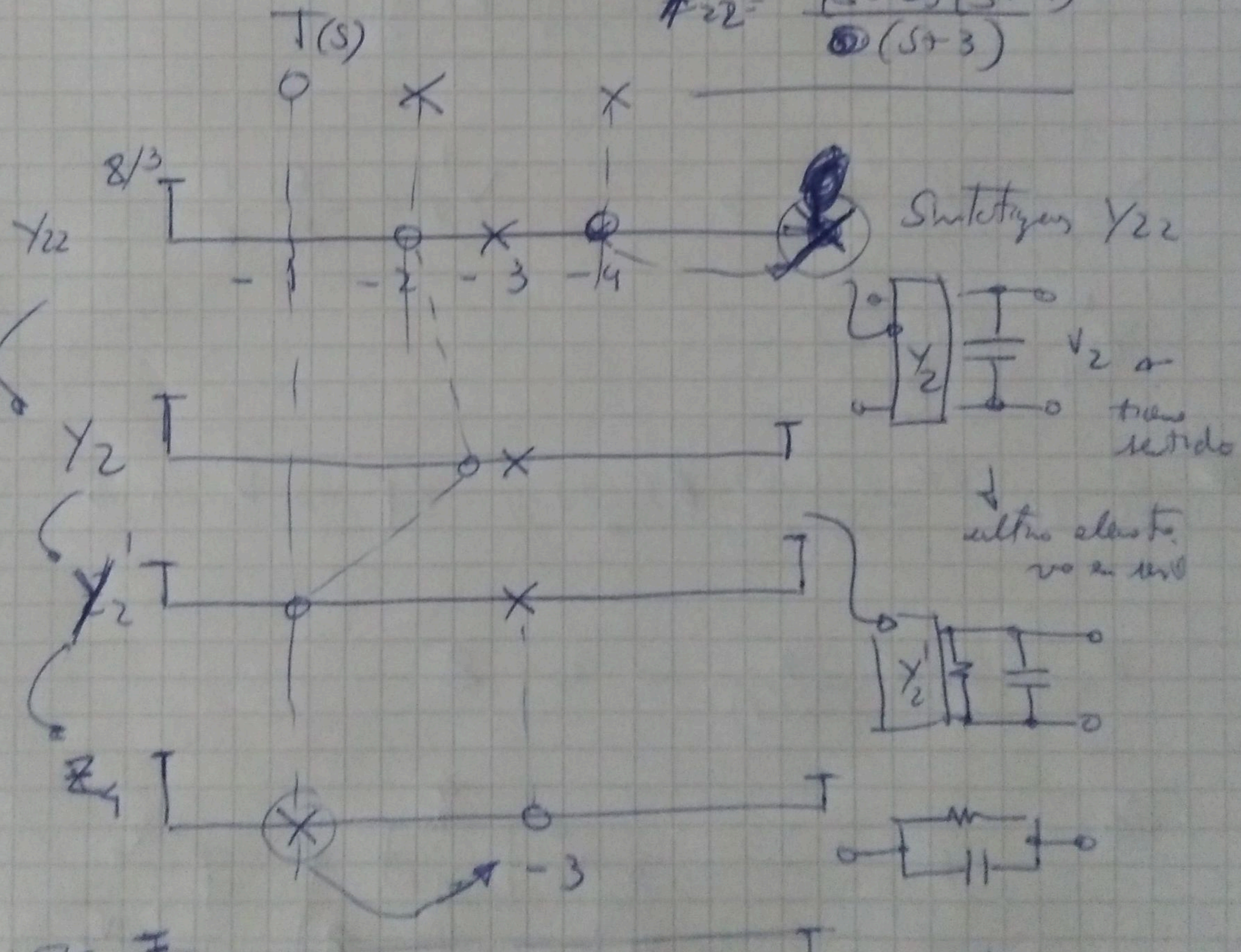
(2) $T(s) = \left.\dfrac{V_2}{V_1}\right|_{I_2=0} = \dfrac{k(s+1)}{(s+2)(s+4)}$

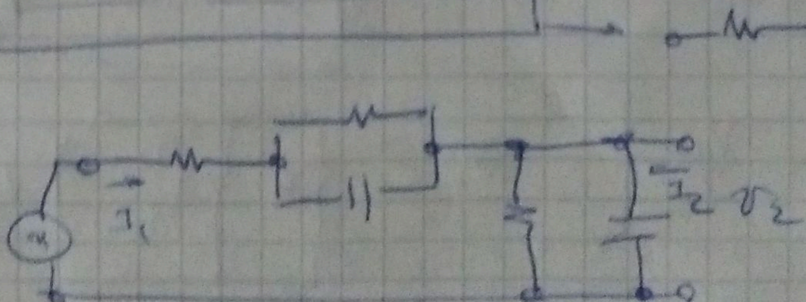


$T(s) = \dfrac{P/D}{Q/D}$ } z_{21} o y_{21} ; } z_{11} o y_{22}

$Z_{11} = \dfrac{(s+2)(s+4)}{s(s+3)}$

$\cancel{Y}_{22} = \dfrac{(s+2)(s+4)}{s(s+3)}$





$Y_2 = Y_{22} - K_\infty s$ / $K_\infty = \lim_{s\to\infty} \frac{Y_{22}(s)}{s}$

$\boxed{K_\infty = 1}$

$Y_2 = Y_{22} - s$

$Y_2 = \frac{3s+8}{s+3} \Rightarrow$

$Y_2'\Big|_{s=-1} = \frac{3s+8}{s+3}\Big|_{s=-1} - k_R \rightarrow Y_2'\Big|_{s=-1} = 0 \Rightarrow$

$k_R = Y_2\Big|_{s=-1}$

$\boxed{k_R = \frac{5}{2}}$

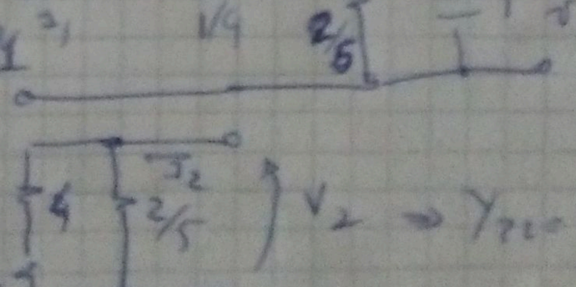
$Y_2' = Y_2 - k_R \Rightarrow \quad Y_2' = \frac{s+1}{2s+6}$

$Z_4' = \frac{2(s+3)}{s+1}$

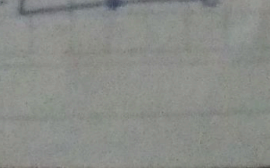
$k_1 = \lim_{s\to -1} \frac{2(s+3)}{(s+1)}(s+1) = 4 \Rightarrow k_1 = 4 \rightarrow$

$Z_6 = Z_4 - \frac{4}{(s+1)} \rightarrow Z_6 = 2$

~~$Z_6 =$~~



$Y_{22} = \frac{V_2}{I_2}\Big|_{V_1=0} \Rightarrow$



$\Rightarrow Y_{22} = \frac{1}{(2+4) \| \frac{2}{5}}$

$\boxed{Y_{22} = \frac{8}{3}}$ ✓

luogo di $T(s) = K \cdot \frac{(s+1)}{(s+2)(s+4)}$

<u>Queremos</u> 0 dB a $s = 0$ $K = 8$.