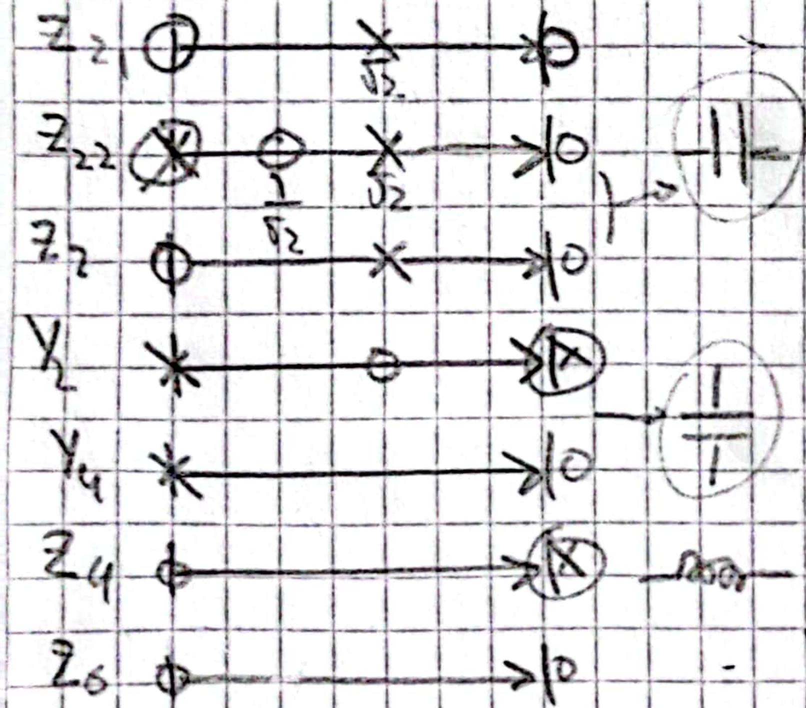
TP 7 1) b) y d)

b) $Z_{21} = \frac{s}{s^2+2}$ $\quad Z_{22} = \frac{1+2s^2}{s(s^2+2)}$ $\quad$ Debo cumplir ceros de Z_{21}



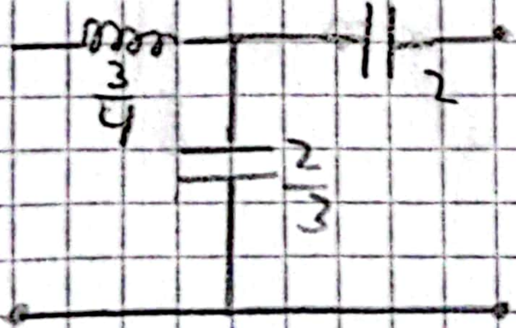
$k_0 = \lim_{s\to 0} \frac{\cancel{s}(1+2s^2)}{\cancel{s}(s^2+2)} = \frac{1}{2}$

$Z_2 = \frac{1+2s^2}{s(s^2+2)} - \frac{0{,}5}{s} = \frac{1+2s^2-0{,}5s^2-1}{s(s^2+2)} = \frac{1{,}5s^{\cancel{2}}}{\cancel{s}(s^2+2)}$

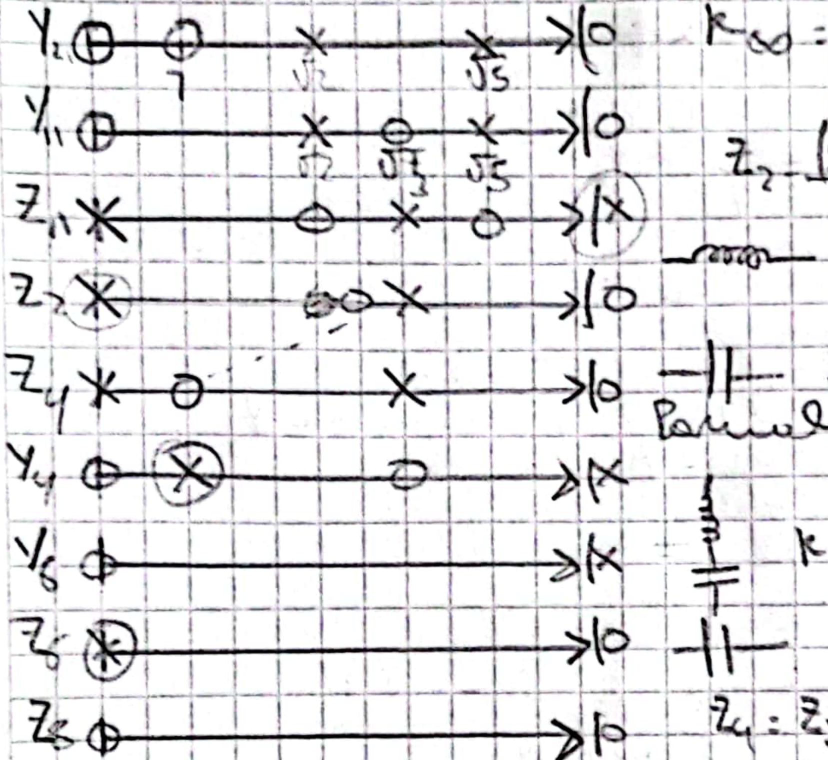
$k_\infty = \lim_{s\to\infty} \frac{s^2+2}{1{,}5s^2} = \frac{1}{1{,}5} = \frac{2}{3}$

$Y_4 = Y_2 - \frac{2}{3}s = \frac{s^2+2}{1{,}5s} - \frac{2}{3}s = \frac{2\cdot 2}{s\cdot 3} = \frac{4}{3s}$

$k_{\infty_2} = \lim_{s\to\infty} \frac{3}{4}\frac{s}{s} = \frac{3}{4}$



d) $-Y_{21} = \frac{s(s^2+1)}{(s^2+2)(s^2+5)}$ $\qquad Y_{11} = \frac{3s(s^2+7/3)}{(s^2+2)(s^2+5)}$



$K_\infty = \lim_{s\to\infty} \frac{(s^2+2)(s^2+5)}{3s^2(s^2+\frac{7}{3})} = \frac{1}{3}$

$Z_2 = \frac{(s^4+7s^2+10)}{3s(s^2+\frac{7}{3})} - \frac{1}{3}s\,\frac{(3s^2+7)}{3s^2+7}$ $\quad \frac{14}{3}$

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

Parcial $\quad Z_4 = Z_2 - \frac{k_0'}{s}\Big|_{s^2=-1} = 0$

$k_0' = \frac{s^2\frac{14}{3}+10}{3(s^2+\frac{7}{3})}\Bigg|_{s^2=-1} = \frac{4}{3}$

$Z_4 = Z_2 - \frac{4}{3}\,\frac{1}{s}\,\frac{(3s^2+7)}{3s^2+7} = \frac{s^2\frac{2}{3}+\frac{2}{3}}{3s(s^2+\frac{7}{3})}$

$Z_4 = \frac{2}{9}\,\frac{s^2+1}{s(s^2+\frac{7}{3})}$ $\qquad 2K_1 = \lim_{s^2\to-1} \frac{s^2+1}{s}\,\frac{9}{2}\,\frac{s(s^2+\frac{7}{3})}{s^2+1} = 6$

$Y_6 = \frac{9}{2}\,\frac{s(s^2+7/3)}{s^2+1} - \frac{6s}{s^2+1} = \frac{\frac{9}{2}s^3+\frac{21}{2}s-6s}{s^2+1} = \frac{9}{2}s\frac{\cancel{(s^2+1)}}{\cancel{s^2+1}}$

$Z_6 = \frac{2}{9s} \qquad \lim_{s\to\infty} \frac{2}{9}\,\frac{s}{s} = \frac{2}{9}$