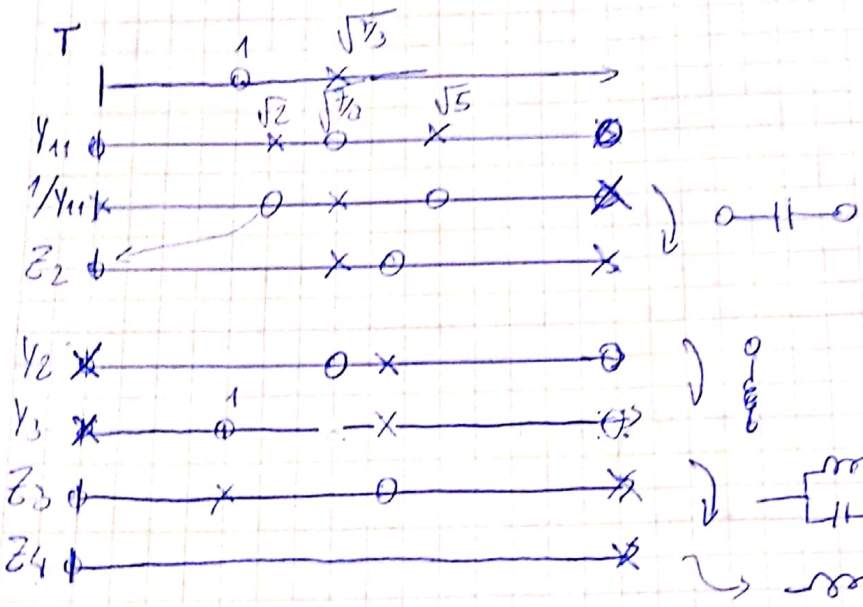
Trabajo semanal 12

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

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



$\left(sC+\frac{1}{sL}\right)^{-1} = \frac{sL}{sCL+1} = \frac{s\,1/C}{s^2+\frac{1}{LC}}$

$Z_{21} = \frac{(s^2+2)(s^2+5)}{3s(s^2+7/3)} - \frac{k_0}{s}$

$k_0 = \lim_{s\to 0} s\,Z_2(0) = \frac{10}{7} = 1/C_1$

$Z_2 = \frac{s^4+7s^2+10-\frac{30}{7}s^2-10}{3s(s^2+7/3)} = \frac{s^2\left(\frac{19}{7}+s^2\right)}{3s(s^2+7/3)}$

$Y_3 = \frac{3(s^2+7/3)}{s(s^2+19/7)} - \frac{k_0}{s}$

$k_0 = \left.\frac{3(s^2+7/3)}{s^2+19/7}\right|_{s=j^1} = \frac{7}{3} = 1/L_1$

$Y_3 = \frac{3s^2+7-7/3s^2-\frac{10}{3}}{s(s^2+19/7)} = \frac{2/3\,s^2+2/3}{s(s^2+19/7)}$

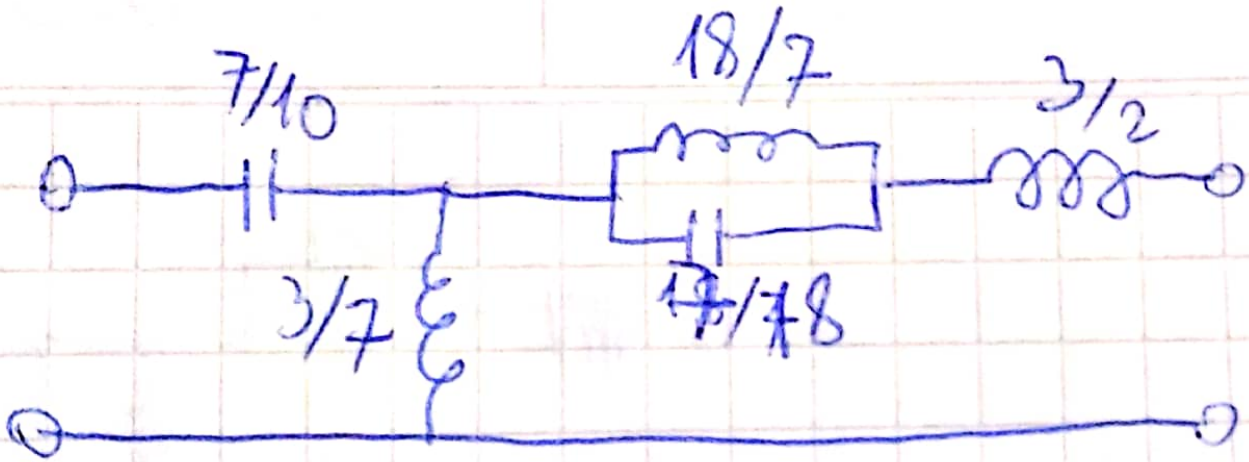
$Z_4 = \frac{s(s^2+19/7)}{2/3(s^2+1)} - \frac{2k\,s}{s^2+1}$

$2k = \lim_{s^2\to -1} \frac{s^2+1}{s} Z_1(s) = 18/7$

$= \frac{s^3+19/7s-18/7s}{2/3(s^2+1)}$

$C_2 = \left(\frac{18}{7}\right)^{-1}$ $L_2 = \left(\frac{7}{18}\right)^{-1}$

$= \frac{s}{2/3} \rightarrow L_3 = 3/2$



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

$Y_{21} = \frac{4(s+1)}{s+3}$ $Y_{22} = \frac{(s+2)(s+4)}{(s+3)}$ $\frac{dY_{Re}}{d\omega} > 0$? ✓

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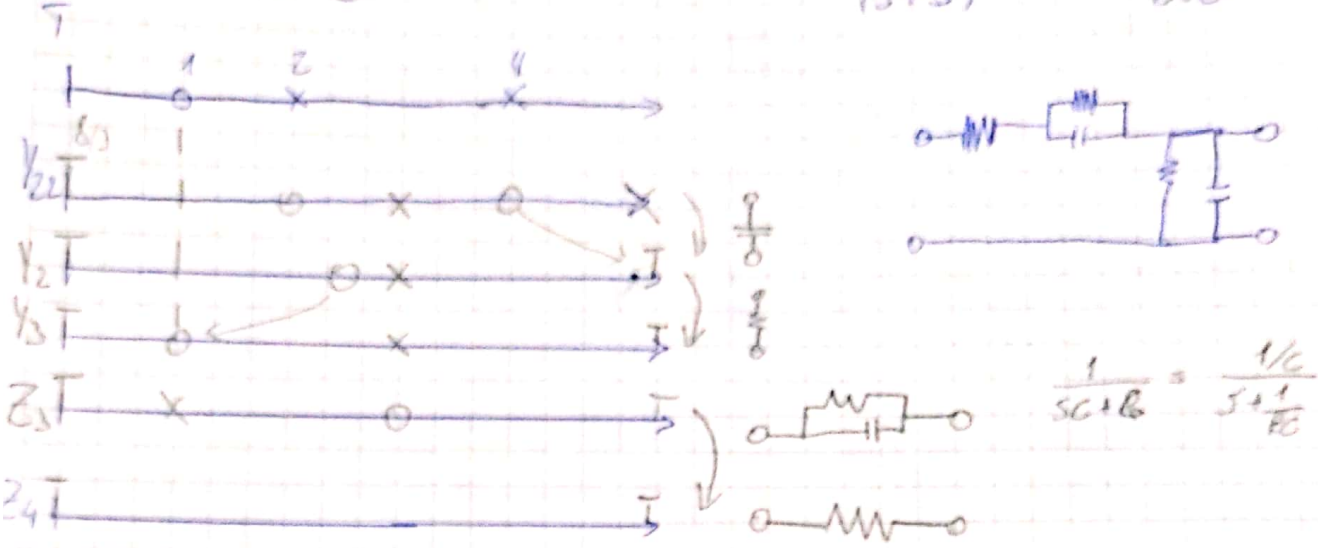

$\frac{1}{sC+G} = \frac{1/C}{s+\frac{1}{RC}}$

$\lim_{s\to\infty} \frac{1}{s} Y_{22}(s) = 1 \rightarrow C_1$

$Y_2 = Y_{22}(s) - s = \frac{s^2+6s+8-s^2-3s}{s+3} = \frac{3s+8}{s+3}$

$G_1 = \frac{3s+8}{s+3}\Big|_{s=\infty} = \therefore$ 5/2

$Y_3 = \frac{s+8}{s+3} - \frac{3s}{s} = \frac{1/4\,s - 1/4}{s+3} = \frac{1/4(s-1)}{s+3}$

$Y_3 = \frac{3s+8-5/2\,s-15/2}{s+3} = \frac{1/2\,s+1/2}{s+3} = 1/2\,\frac{(s+1)}{s+3}$

$Z_4 = \frac{\frac{Z_3}{s+3}}{1/2(s+1)} - \frac{2K}{s+1} = 2\frac{s+1}{s+1} = 2 = R_3$

$2K = \lim_{s\to-1} Z_3(s+1) = 4 \rightarrow C_2 = 1/4$ $R_2 = 4$

$[k = \lim_{s\to\infty} Y_{21} = 1/2]$