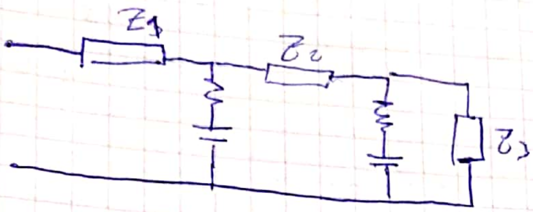
Trabajo Semanal 10

1)



$Y_{RC} = \frac{sG}{s+\frac{1}{RC}}$

$R_1C_1 = 1/6$

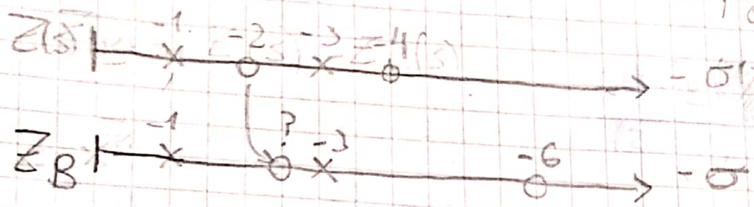
$R_2C_2 = 2/7$ $6 \cdot 3{,}5$

$R + \frac{1}{sC} = \frac{sCR+1}{sC} = \frac{s+1/CR}{s\,1/R}$

$$Z(s) = \frac{s^2+6s+8}{s^2+4s+3}$$

→ Ceros ⇒ −2 y −4

Polos ⇒ −1 y −3



$$Z_B(s)\Big|_{s=-6} = Z(s) - Z_1(s)\Big|_{s=-6} = 0$$

$$Z_1(s) = \frac{8}{15}$$

$$Z_B(s) = \frac{\frac{7}{15}s^2 + \frac{58}{15}s + \frac{32}{5}}{s^2+4s+3} = \frac{(s+6)\left(s+\frac{16}{7}\right)\cdot\frac{7}{15}}{(s+1)(s+3)}$$

$$Y_B = \frac{(s+1)(s+3)}{(s+6)\left(s+\frac{16}{7}\right)\frac{7}{15}} = Y_{RC1} + Y_C$$

$$K_1 = \lim_{s\to -6} \frac{(s+6)}{s} Y_B(s) = \frac{75}{52} \Rightarrow \frac{1}{R_1} \Rightarrow \left[R_1 = \frac{52}{78} \quad C_1 = \frac{35}{13}\right]$$

$$Y_C = \frac{s^2+4s+3}{\frac{7}{15}s^2 + \frac{58}{15}s + \frac{32}{5}} - \frac{\frac{75}{52}\,s\left(s+\frac{16}{7}\right)\cdot\frac{7}{15}}{(s+6)\left(s+\frac{16}{7}\right)\frac{7}{15}}$$

$$Y_C = \frac{\frac{17}{52}s^2 + \frac{32}{13}s + 3}{\frac{7}{15}s^2 + \frac{58}{13}s + \frac{32}{5}} = \frac{\frac{17}{52}\left(s+\frac{26}{17}\right)\cancel{(s+6)}}{\frac{7}{15}\cancel{(s+6)}\left(s+\frac{16}{7}\right)}$$

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$$\frac{1139}{624}$$

$$Z_c = \frac{7/15\,(s+16/7)}{17/52\,(s+26/17)}$$

$$\left[Z_2 = Z_c \Big|_{s=-7/2} = \frac{884}{1005} \cong 0{,}88 \right]$$

$$Z_D = Z_c - Z_2 = \frac{7/15\,(s+16/7)}{17/52\,(s+26/17)} - 0{,}886$$

$$Z_D = \frac{\frac{12}{67}s + \frac{42}{67}}{\frac{17}{52}\,(s+\frac{26}{17})} = Z_2$$

$$Y_D = \frac{\frac{17}{52}\,(s+26/17)}{\frac{12}{67}\,(s+3{,}5)} = 1/R_L + 1/Z_3$$

$$K_2 = \lim_{s\to -\frac{7}{2}} \frac{s+3{,}5}{s}\, Y_D(s) = \frac{4489}{4368} = 1{,}0277 = \frac{G_2}{C_2}$$

$$\left[R_2 = 0{,}973 \quad C_2 = \frac{4489}{15288} \cong 0{,}294 \right]$$

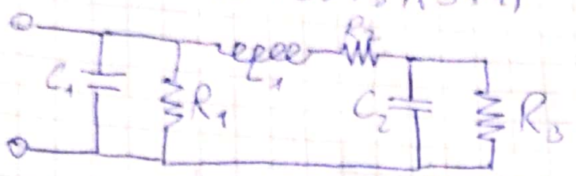
$$Y_D = Y_3 + \frac{1{,}0277\,s}{s+3{,}5} = 1{,}8253\,\frac{s+26/17}{s+3{,}5}$$

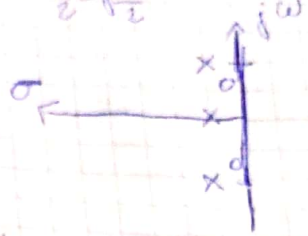
$$Y_3 = \frac{\frac{67}{84}s + \frac{67}{24}}{s+3{,}5} = \frac{67}{84} \cong 0{,}7976$$

$$\left[Z_3 \cong 1{,}2537 \right]$$

2)

$$Z(s) = \frac{s^2+s+1}{(s^2+2s+5)(s+1)} \quad \text{ceros: } -\frac{1}{2} \pm j\frac{\sqrt{3}}{2}$$





$Y_{RC} = sC + G = C(s + \frac{G}{C})$

$Z_{RL} = sL + R_2 = L(s + \frac{R_2}{L})$

$$Y(s) = \frac{(s^2+2s+5)(s+1)}{s^2+s+1}$$

$$\lim_{s\to\infty} \frac{1}{s} Y(s) = 1 \rightarrow \boxed{C_1 = 1}$$

$$Y_2(s) = \frac{s^3+3s^2+7s+5}{s^2+s+1} - s = \frac{2s^2+6s+5}{s^2+s+1}$$

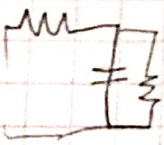
$$Z_2(s) = \frac{s^2+s+1}{2s^2+s+1}$$

$$R_1 = \lim_{s\to\infty} Z_2(s) = 1/2$$

$$Y_3(s) = \frac{2s^2+6s+5}{s^2+s+1} - 2 = \frac{4s+3}{s^2+s+1}$$

$$Z_3(s) = \frac{s^2+s+1}{4s+3} = Z_{RL} + \underbrace{Z_4}_{\to 0 \text{ y } \infty} = k + sk_\infty + \frac{K_1}{s+\omega}^{1/C}$$

$$\lim_{s\to\infty} \frac{1}{s} Z_3(s) = 1/4 = k_\infty = L_1$$



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

$$K_1 = \lim_{s\to -3/4} (4s+3)\frac{1/4\, s+1}{4s+3} = \frac{13}{16} \Rightarrow C = \frac{16}{13} \quad R_3 = \frac{13}{12}$$

$$R_2 = \frac{1/4\, s+1}{4s+3} - \frac{13/16}{4s+3} = \frac{1}{16}\frac{4s+3}{4s+3}$$

$$R_2 = 1/16$$

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