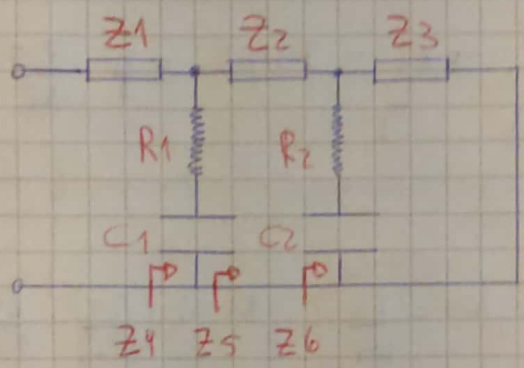
TAREA SEMANAL 10

1)

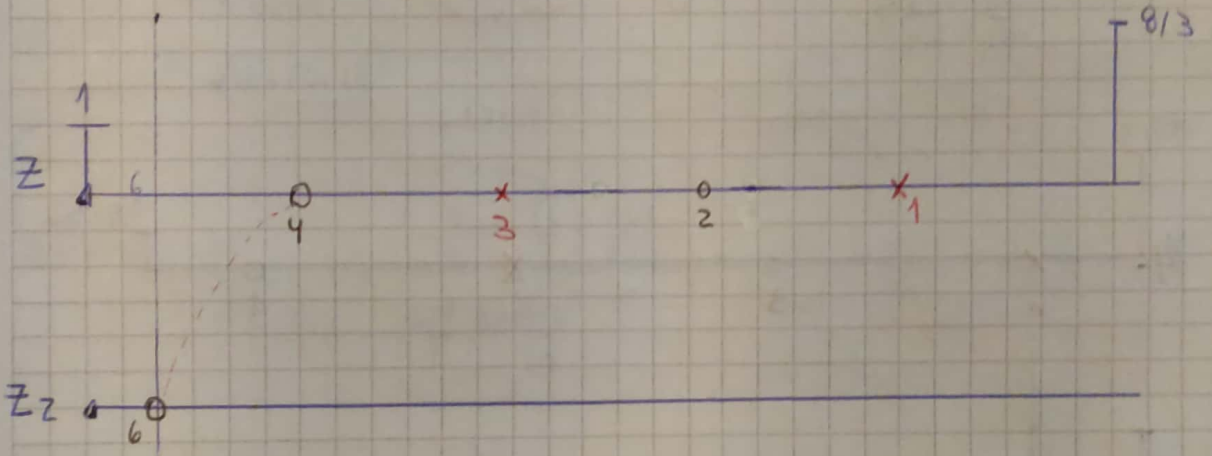


DATOS:

$R_1 \cdot C_1 = 1/6$

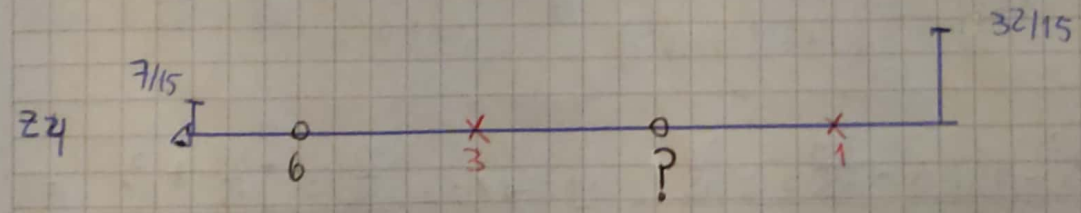
$R_2 \cdot C_2 = 2/7$

$$Z(s) = \frac{(s^2+6s+8)}{(s^2+4s+3)} = \frac{(s+4)(s+2)}{(s+1)(s+3)}$$



$$Z(s) - Z1 = Z4 \Rightarrow Z1 = Z\Big|_{s=0} \quad (s=0 \Rightarrow 1 \Rightarrow o=0)$$

$$\Rightarrow Z1 = \frac{(-6+4)(-6+2)}{(-6+1)(-6+3)} \Rightarrow Z1 = \frac{8}{15}$$



$$Z4(s) = Z(s) - \frac{8}{15} = \frac{s^2+6s+8 - \frac{8}{15}s^2 - 4\cdot\frac{8}{15}s - 3\cdot\frac{8}{15}}{s^2+4s+3}$$

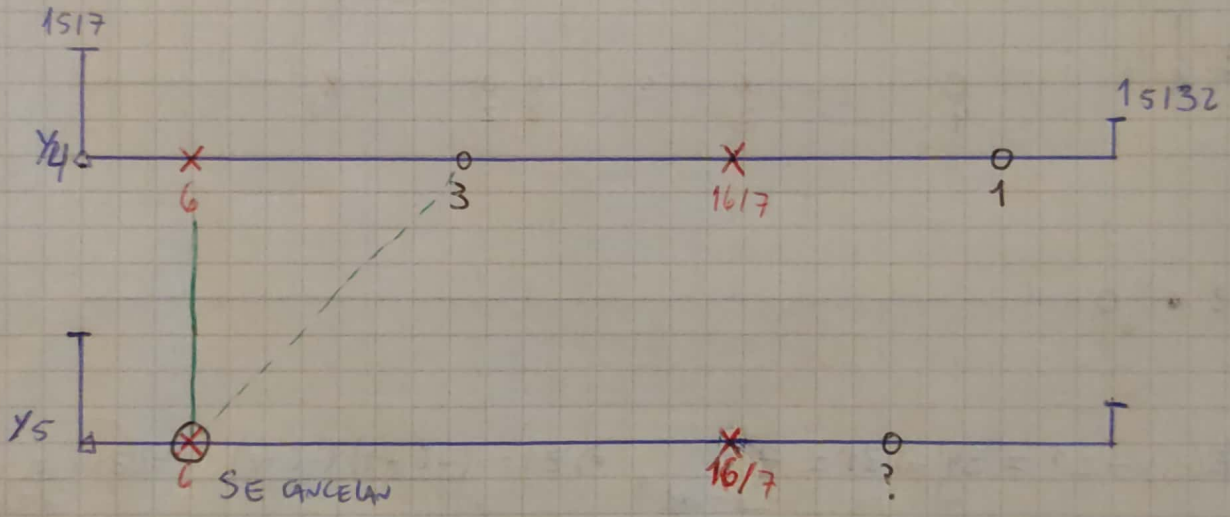
$$Z4(s) = \frac{\frac{7}{15}s^2 + \frac{52}{15} + \frac{32}{5}}{(s+1)(s+3)} \rightarrow Z4(s) = \frac{7}{15}\,\frac{(s+6)\left(s+\frac{16}{7}\right)}{(s+1)(s+3)}$$

$Y_4(s) = 1/Z_2(s) = \frac{15}{7} \frac{(s+1)(s+3)}{(s+6)(s+16/7)}$; EL RC ES $\frac{Kis}{s+6}$

$Ki = \lim_{s \to -6} \frac{15}{7} \frac{(s+6)}{s} \frac{(s+1)(s+3)}{(s+6)(s+16/7)} \rightarrow Ki = 75/52 = \frac{15}{7} \cdot \frac{35}{52}$

EL RC $\Rightarrow Y_{RC_1} = \frac{1}{\frac{1}{\frac{75}{52}} + \frac{1}{\frac{25}{104} s}}$ $\rightarrow$ $R_1 = \frac{52}{75}$; $C_1 = \frac{25}{104}$; $R_1 \cdot C_1 = \left(\frac{75}{52}\right)^{-1} \cdot \frac{25}{104}$

$R_1 \cdot C_1 = 1/6$



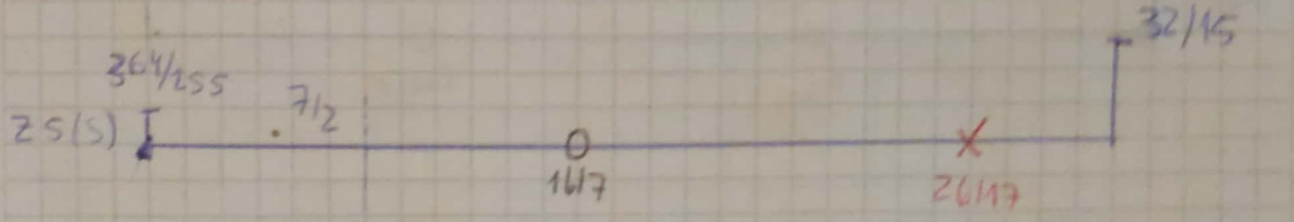
$Y_5 = Y_4 - \frac{K_1 s}{s+6} = \frac{(s+1)(s+3)}{(s+6)(s+16/7)} \frac{15}{7} - \frac{s}{s+6} \frac{15}{7} \cdot \frac{35}{52}$

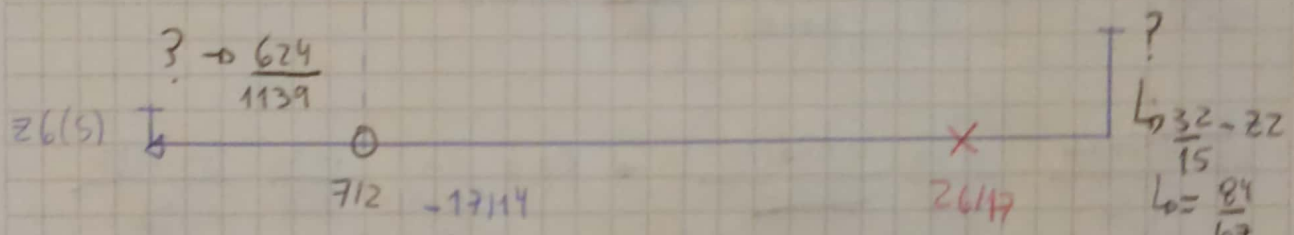
$Y_5(s) = \frac{s^2 + 4s + 3 - \frac{35}{52} s^2 - \frac{20}{13} s}{(s+6)(s+16/7)} \frac{15}{7}$ $\rightarrow Y_5 = \frac{\frac{17}{52} s^2 + \frac{32}{13} + 3}{(s+6)(s+16/7)} \frac{15}{7}$

$Y_5(s) = \frac{17}{52} \frac{(s + \frac{26}{17})(s+6)}{(s+6)(s+16/7)} \cdot \frac{15}{7}$

NOTA

$$Y_S(S) = \frac{255}{364}\ \frac{S+26/17}{S+16/17} \rightarrow Z_S(S) = \frac{364}{255}\ \frac{S+16/17}{S+26/17}$$





$$Z_2 = Z_S(S)\Big|_{S=7/2} = \frac{\left(-\frac{7}{2}+\frac{16}{7}\right)\frac{364}{255}}{-\frac{7}{2}+\frac{26}{17}} = \frac{884}{1005} = \frac{289}{469}\cdot\frac{364}{255}$$

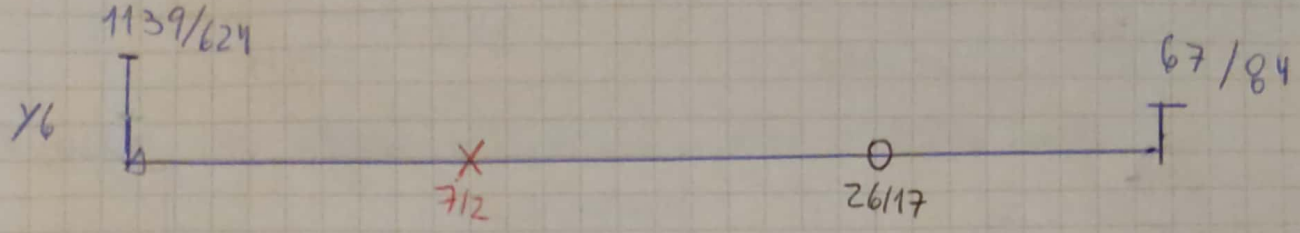
$$Z_2 = 884/1005$$

$$Z_6 = Z_S(S) - Z_2 = \frac{364}{255}\left[\frac{S+16/17}{S+26/17} - \frac{289}{469}\right]$$

$$Z_6 = \frac{364}{255}\ \frac{S+\frac{16}{7}-\frac{289}{469}S-\frac{442}{469}}{S+26/17} \Rightarrow Z_6 = \frac{364}{255}\ \frac{\frac{180}{469}S+\frac{90}{67}}{S+26/17}$$

$$Z_6 = \frac{364}{255}\cdot\frac{180}{469}\ \frac{S+7/2}{S+26/17} \rightarrow Z_6 = \frac{624}{1139}\ \frac{S+7/2}{S+26/17}$$

$$Y_6 = 1/Z_6 = \frac{1139}{624}\,\frac{S+26/17}{S+712}$$



$$\frac{K_2 S}{S+712} = Y_{RC_2} \rightarrow K_2 = \lim_{S\to -712} \frac{S+712}{S} \cdot Y_6(S)$$

$$K_2 = \lim_{S\to -712} \left(\frac{S+712}{S} \cdot \frac{1139}{624}\,\frac{S+26/17}{S+712} \right) \rightarrow K_2 = \lim_{S\to -712} \frac{1139}{624}\,\frac{S+26/17}{S}$$

$$K_2 = \frac{1139}{624}\,\frac{-712+26/17}{-712} \rightarrow \boxed{K_2 = \frac{4489}{4368}}$$

$$Y_{RC_2}(S) = \frac{1}{\frac{4368}{4489} + \frac{1}{S\,\frac{4489}{15288}}}$$

$$\boxed{R_2 = 4368/4489} \quad ; \quad \boxed{C_2 = 4489/15288}$$

$$Z_3^{-1} = Y_3 = Y_6 - \frac{\frac{4489}{4368}}{S+712} = \frac{S+26/17}{S+712}\,\frac{1139}{624} - \frac{1139}{624}\cdot\frac{67}{119}\,\frac{S}{S+712}$$

$$Y_3 = \frac{1139}{624}\left[\frac{S+26/17 - \frac{67}{119}S}{S+712}\right] = \frac{1139}{624}\left[\frac{\frac{52}{119}S + \frac{26}{17}}{S+712}\right]$$

$$Y_3 = \frac{1139}{624}\,\frac{52}{119}\,\frac{S+712}{S+712} \Rightarrow Y_3 = \frac{67}{84} \; ; \; \boxed{Z_3 = 84/67}$$

CIRCUITO FINAL