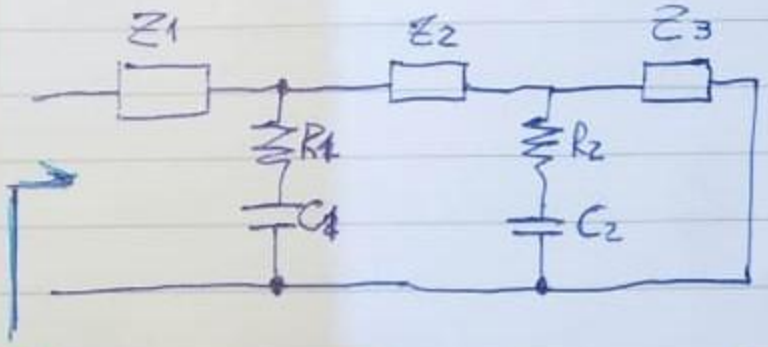
Tarea Semanal 10

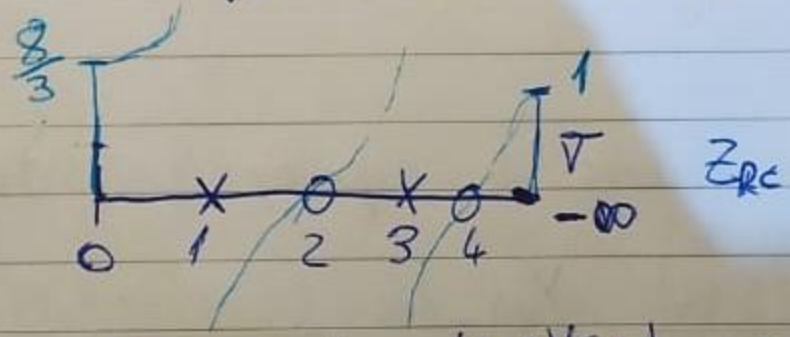


Z_{RC}

$R_1 . C_1 = \frac{1}{6}$ → Resuena a 6

$R_2 . C_2 = \frac{2}{7}$ → Resuena a $\frac{7}{2}$

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



$$\lim_{s\to 0} Z_{RC}(s) = \lim_{s\to 0} \frac{(s+4)(s+2)}{(s+1)(s+3)} = \frac{8}{3}$$

$$\lim_{s\to \infty} Z_{RC}(s) = \lim_{s\to \infty} \frac{(s+4)(s+2)}{(s+1)(s+3)} = 1$$

Vamos a remover paralelamente un resistor en Z_1 Para desplazar el cero de 4 a 6

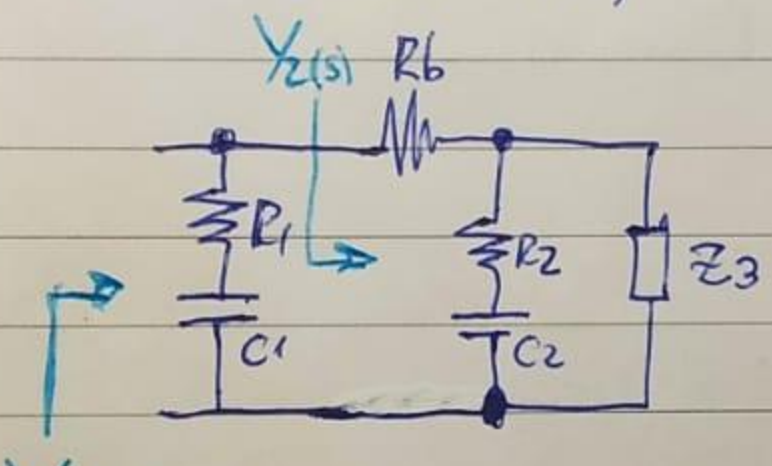
$$\lim_{s\to(-6)} Z(s) - k_0 = 0 \Rightarrow \lim_{s\to(-6)} Z(s) = \lim_{s\to -6} \frac{(s+4)(s+2)}{(s+1)(s+3)} = \frac{8}{15}$$

1.b

$$Z_{1(s)} = Z(s) - \frac{8}{15} = \frac{(s+4)(s+2) - \frac{8}{15}(s+3)(s+1)}{(s+3)(s+1)}$$

$$Z_{1(s)} = \frac{(s+6)(s+16/7)}{(s+1)(s+3)\ 15/7}$$

$$Y_{1(s)} = \frac{(s+1)(s+3)}{(s+6)(s+16/7)} \cdot \frac{15}{7}$$



Ahora buscamos el valor de capacitor y resistencia

$$K_i = \lim_{s \to -6} \frac{(s+6)}{s} \cdot Y_{1(s)} = \lim_{s \to -6} \frac{(s+1)(s+3)}{(s+6)(s+16/7)} \frac{15}{7} \frac{(s+6)}{s}$$

$$K_i = \frac{75}{52} \qquad R_1 = \frac{52}{75} \qquad C_1 = \frac{K_i}{T_i} = \frac{25}{104}$$

Los removemos

$$Y_{2(s)} = Y_{1(s)} - \frac{s \cdot 75/52}{s+6} = \frac{255/364\ (s+26/17)}{(s+16/7)}$$

$$Z_2(s) = \frac{364/255\,(s+16/7)}{(s+26/17)}$$

Ahora removemos paralelamente el resistor

$$\lim_{s\to 7/2} Z_2(s) = k_0 = \lim_{s\to 7/2} \frac{364/255\,(s+16/7)}{(s+26/17)} = \frac{884}{1005}$$

$$R_0 = \frac{884}{1005}$$

$$Z_3(s) = Z_2(s) - k_0 = \frac{364/255\,(s+16/7) - 884/1005\,(s+26/17)}{s+26/17}$$

$$Z_3(s) = \frac{624/1139\,(s+7/2)}{s+26/17} \Rightarrow Y_3(s) = \frac{1139/624\,(s+26/17)}{s+7/2}$$

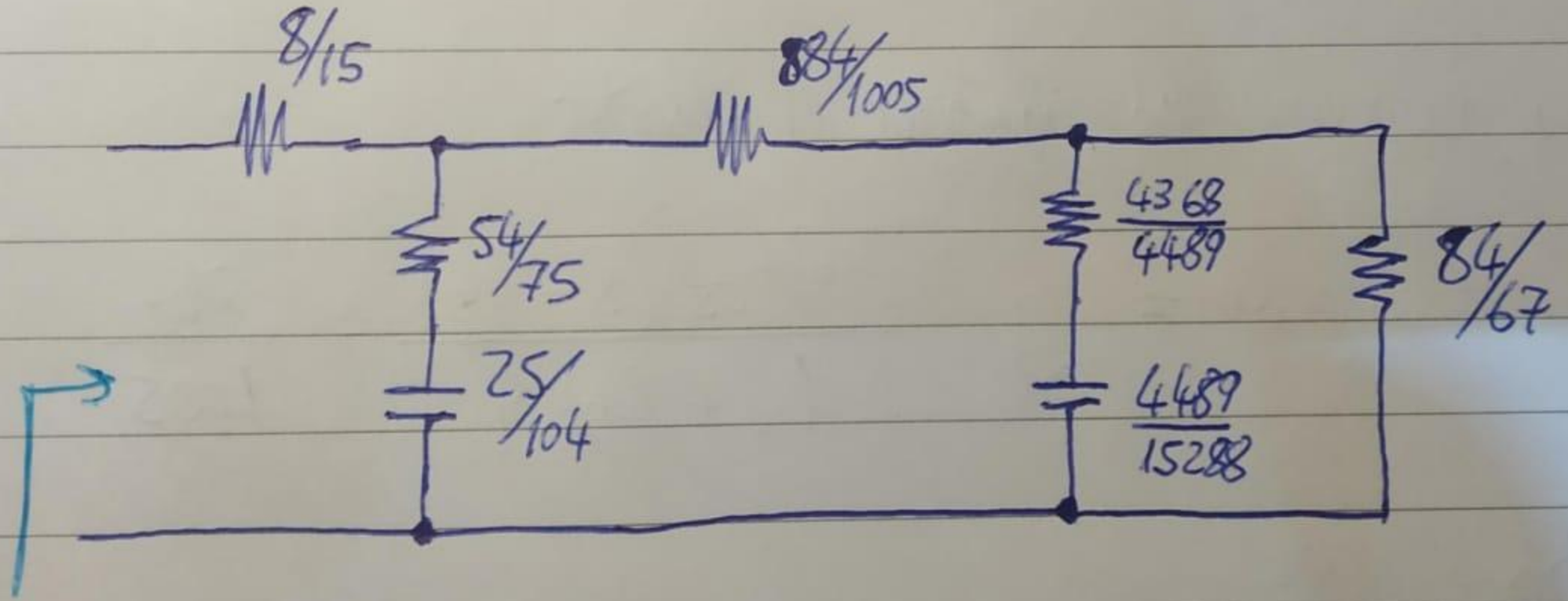
Ahora buscamos el valor de cap y resistencia

$$\lim_{s\to -7/2} Z_3(s)\cdot\frac{(s+7/2)}{s} = \frac{4489}{4368}$$

$$R_2 = \frac{4368}{4489} \qquad C_2 = \frac{k_2}{r_2} = \frac{4489}{15288}$$

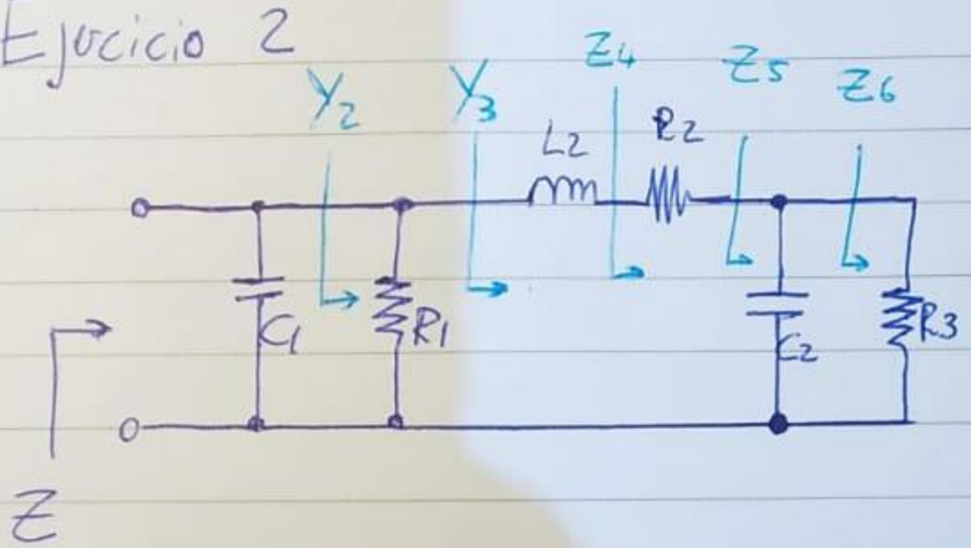
$$Y_4(s) = \frac{1138/624\,(s+26/17) - s\cdot\frac{4489}{4368}}{(s+7/2)} = \frac{67}{84} \Rightarrow Z_4(s) = \frac{84}{67}$$

$$R_C = \frac{84}{67}$$



Z_{RC}

Ejercicio 2



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

Primero buscamos remover el capacitor C1

$$C_1 = \lim_{s\to\infty} Z(s)\cdot s = \frac{(s^2+s+1)}{(s^2+2s+5)(s+1)} = 1$$

$$Y_{2(s)} = Y_{(s)} - s\cdot C_1$$

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

Ahora sacamos la resistencia del menor extremo

$$\lim_{s\to\infty} Y_{2(s)} = 2 \quad ; \quad \lim_{s\to 0} Y_{2(s)} = 5$$

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

$$Z_{3(S)} = \frac{S^2+S+1}{4S+3}$$

Removemos el inductor como polo en infinito

$$\lim_{S\to\infty} \frac{Z_{3(S)}}{S} = \lim_{S\to\infty} \frac{S^2+S+1}{4S^2+3S} = \frac{1}{4}$$

$$Z_{4(S)} = Z_{3(S)} - \frac{1}{4}.S = \frac{1/4.S+1}{4S+3}$$

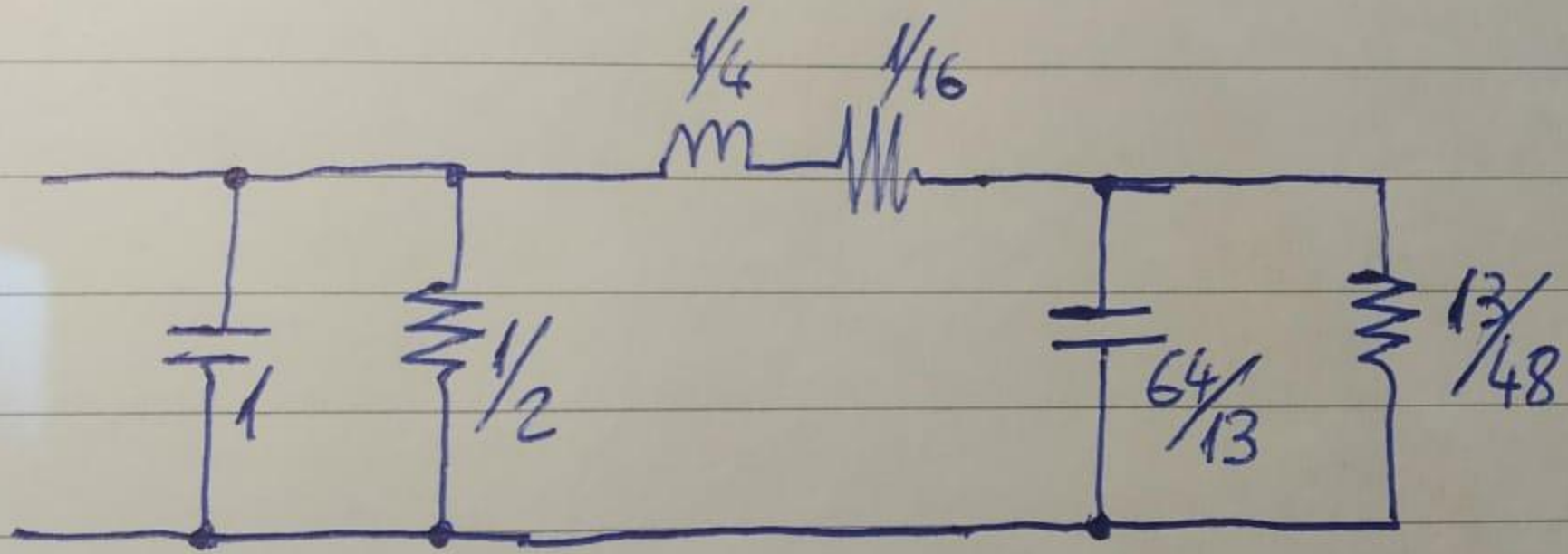
Ahora removemos la resistencia desde el lado menor

$$\lim_{S\to\infty} Z_{4(S)} = \frac{1}{16} \qquad \lim_{S\to 0} Z_{4(S)} = \frac{1}{3}$$

$$Z_{5(S)} = \frac{1/4.S+1}{4S+3} - 1/16 = \frac{13/16}{4S+3} \Rightarrow Y_{5(S)} = \frac{4S+3}{13/16}$$

Ahora removemos polo en infinito

$$\lim_{S\to\infty} \frac{Y_{5(S)}}{S} = \frac{4S+3}{13.S/16} = \frac{4.16}{13} = \frac{64}{13}$$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1
1/2
64/13
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