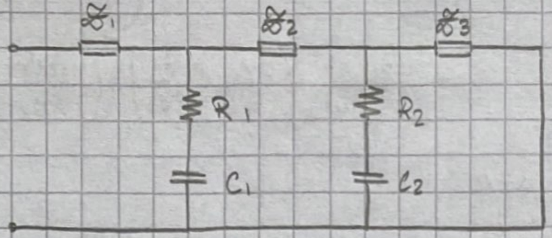
TS 10

1)

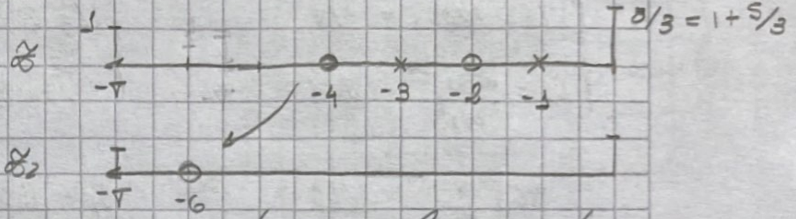


$R_1 C_1 = \frac{1}{6}$

$R_2 C_2 = \frac{2}{7}$

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

$8/3 = 1 + 5/3$



Asumo que es un RC y remuevo parte de la resistencia

$$\lim_{s \to -6} \frac{(s+4)(s+2)}{(s+1)(s+3)} - k_1 = 0 \longrightarrow \frac{-2\cdot(-4)}{-5\cdot(-3)} - k = \frac{8}{15} - k = 0$$

$k_1 = \frac{8}{15}$ $\qquad Z_2 = Z - \frac{8}{15} = \frac{s^2+6s+8 - 8/15\, s^2 - 32/15\, s - 8/5}{(s+1)(s+3)}$

$$Z_2 = \frac{\frac{7}{15}s^2 + \frac{58}{15}s + 32/5}{(s+1)(s+3)} = \frac{7}{15}\,\frac{s^2 + 58/7\, s + \frac{96}{7}}{(s+1)(s+3)} = \frac{(s+16/7)(s+6)}{(s+1)(s+3)}$$

$Y_4 = Y_2 - \frac{s k_i}{s+6}$ $\qquad k_i = Y_2\Big|_{s=-6} \cdot \frac{s+6}{s} = \frac{15}{7}\,\frac{-5\cdot(-3)}{-6\,(-26/7)} = \frac{75}{52}$

$$Y_4 = \frac{15}{7}\,\frac{s^2+4s+3}{(s+16/7)(s+6)} - \frac{s\cdot 75/52}{s+6} = \frac{15}{7}\,\frac{s^2+4s+3 - \frac{35}{52}s(s+16/7)}{(s+16/7)(s+6)}$$

$$Y_4 = \frac{15}{7}\,\frac{\frac{17}{52}s^2 + \frac{32}{13}s + 3}{(s+16/7)(s+6)} = 0,7\,\frac{s^2 + \frac{128}{17}s + \frac{156}{17}}{\dots} = 0,7\,\frac{(s+\frac{26}{17})\,\cancel{(s+6)}}{(s+\frac{16}{7})\,\cancel{(s+6)}}$$

$$Z_6 = Z_4 - k_2 \Longrightarrow \lim_{s \to -\frac{7}{2}} \left(\frac{1}{0,7}\,\frac{s+16/7}{s+26/17} - k_2 = 0\right) \qquad k_2 = 0,88$$

$$Z_6 = \frac{1}{0,7}\cdot\left(\frac{s+16/7 - \frac{289}{469}(s+26/17)}{s+26/17}\right) = \frac{1}{0,7}\cdot\frac{\frac{180}{469}s + \frac{90}{67}}{s+26/17} = \frac{1800}{3283}\,\frac{s+7/2}{s+26/17}$$

$Y_8 = Y_6 - \frac{s k_j}{s+7/2}$ $\qquad k_j = Y_6\Big|_{s=-\frac{7}{2}} \cdot \frac{s+7/2}{s} = \frac{-7/2+26/17}{-7/2}\cdot\frac{3283}{1800}$

$k_j = \frac{67}{119}\cdot\frac{3283}{1800}$

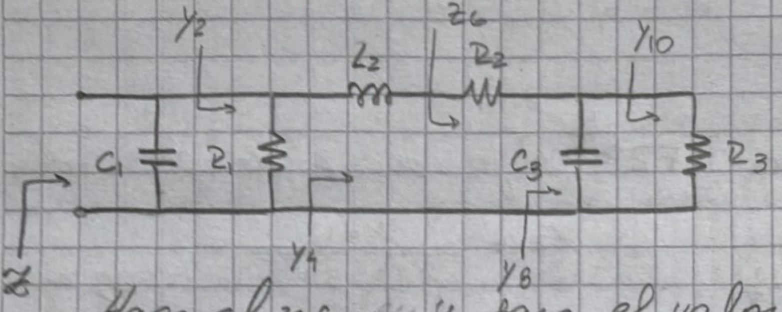
$$Y_8 = \frac{3283}{1800}\cdot\frac{s+26/17 - \frac{67}{119}s}{s+7/2}$$

$$Y_8 = \frac{3283}{1800}\cdot\frac{\frac{52}{119}s + 26/17}{s+7/2} = \frac{6097}{7650}\cdot\frac{\cancel{s+7/2}}{\cancel{s+7/2}} \cong 0,8 \quad :)$$

$k_1 = Z_1 = \frac{8}{15}\,\Omega$ $\qquad k_2 = Z_2 = 0,88\,\Omega$ $\qquad k_3 = Z_3 = \frac{1}{0,8}\,\Omega = 1,25\,\Omega$

NOTA $R_1 = \frac{1}{k_i} = \frac{52}{75}$ $\qquad C_1 = \frac{\tau_i}{k_i} = \frac{25}{104}$ $\qquad R_2 = \frac{1}{k_j} = 0,974$ $\qquad C_2 = \frac{\tau_j}{k_j} = 3,41$

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



El circuito es una guía para hacer el método gráfico, pero como es RLC, tendría que hacerlo en el plano

Siempre empiezo removiendo el componente activo

Hago el resto y saco el valor de C_1 (primer elemento que remuevo)

$y(s) = \dfrac{(s^2+2s+5)(s+1)}{s^2+s+1}$ $\quad \lim_{s\to\infty} \dfrac{1}{s} \cdot y(s) = 1$

$y_2(s) = \dfrac{1}{Z(s)} - s \cdot k_\infty = \dfrac{2s^2+6s+5}{s^2+s+1}$ $\quad \lim_{s\to\infty} y_2(s) = 2$ → saco el menor

$\lim_{s\to 0} y_2(s) = 5$

↓ 0 en ∞

$R_1 = 1/2$

$y_4(s) = y_2(s) - 2 = \dfrac{2s^2+6s+5-2s^2-2s-2}{s^2+s+1} = \dfrac{4s+3}{s^2+s+1}$

$Z_4(s) = \dfrac{s^2+s+1}{4s+3}$

$Z_6(s) = Z_4(s) - s \cdot k'_\infty$ $\quad k'_\infty = \lim_{s\to\infty} \dfrac{s^2+s+1}{4s^2+3s} = \dfrac{1}{4} = L_2$

$Z_6(s) = \dfrac{s^2+s+1}{4s+3} - \dfrac{1}{4}s = \dfrac{s^2+s+1-s^2-3/4 s}{4s+3} = \dfrac{1/4 s+1}{4s+3} = \dfrac{s+4}{16(s+3/4)}$

$\lim_{s\to\infty} \dfrac{s+4}{16(s+3/4)} = \dfrac{1}{16}$ $\quad \lim_{s\to 0} \dfrac{1}{3}$ $\quad R_2 = \dfrac{1}{16}$

$Z_8(s) = Z_6(s) - \dfrac{1}{16} = \dfrac{s+4-s-3/4}{16(s+3/4)} = \dfrac{13}{4 \cdot 16(s+3/4)}$

$y_{10}(s) = y_8(s) - k''_\infty s = \dfrac{64}{13}s + \dfrac{48}{13} - \dfrac{64}{13}s$ $\quad \lim_{s\to\infty} \dfrac{1}{s} \cdot \dfrac{4 \cdot 16(s+3/4)}{13} = \dfrac{64}{13}$

$y_{10}(s) = \dfrac{48}{13}$ → $R_3 = \dfrac{13}{48}$ $\quad C_3 = \dfrac{64}{13}$