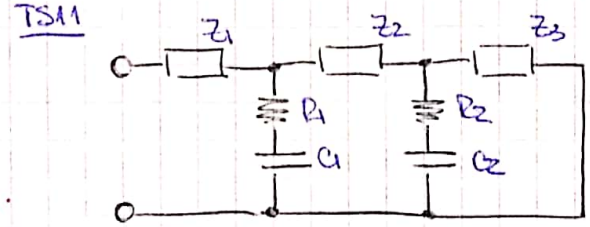
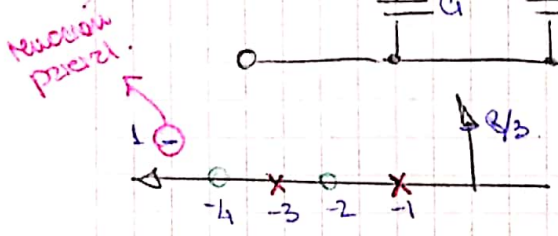
TS11



$R_1C_1 = \frac{1}{6}$ $R_2C_2 = \frac{2}{7}$

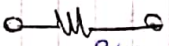
$$Z(s) = \frac{s^2+6s+8}{s^2+4s+3} = \frac{(s+2)(s+4)}{(s+1)(s+3)}$$

$Z(\infty) = 1$ $Z(0) = \frac{8}{3}$.



$Z(s) - k_\infty' = Z_2(s) = 0 \Big|_{s=-6}$ → para lograr la condición de $R_1C_1 = 1/6$.

$$k_\infty' = Z(-6) = \frac{(-6+2)(-6+4)}{(-6+1)(-6+3)} = \frac{8}{15}$$

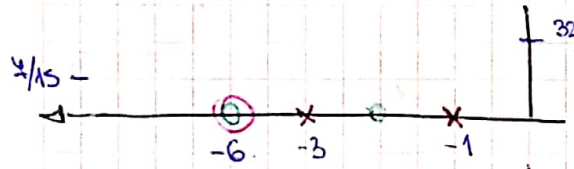


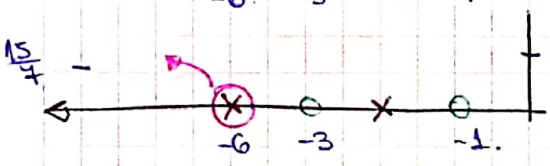
$$Z_2(s) = \frac{s^2+6s+8}{s^2+4s+3} - \frac{8}{15} = \frac{15s^2+90s+120-8s^2-32s-24}{15(s^2+4s+3)} = \frac{7s^2+58s+96}{15(s^2+4s+3)}$$

$$Z_2(s) = \frac{7}{15}\cdot\frac{s^2+\frac{58}{7}s+\frac{96}{7}}{s^2+4s+3} = \frac{7}{15}\cdot\frac{(s+16/7)(s+6)}{(s+1)(s+3)}$$

$Z_2(0) = \frac{32}{15}$

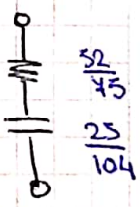
$Z_2(\infty) = \frac{7}{15}$.





$$k_3 = \lim_{s\to -6} \frac{s-6}{s} Y_2(s) = \lim_{s\to -6} \frac{s+6}{s} \frac{15}{7} \frac{(s+1)(s+3)}{(s+16/7)(s+6)}$$

$$k_3 = \frac{(15)(-6+1)(-6+3)}{(-6)(7)(-6+\frac{16}{7})} = \frac{45}{52}$$



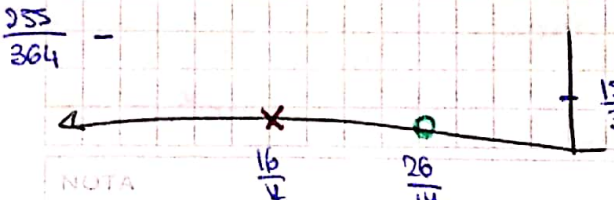
$$Y_4 = Y_2 - \frac{s\cdot\frac{45}{52}}{s+6} = \frac{15}{7}\cdot\frac{(s+1)(s+3)}{(s+16/7)(s+6)} - \frac{s\cdot 45/52}{s+6}$$

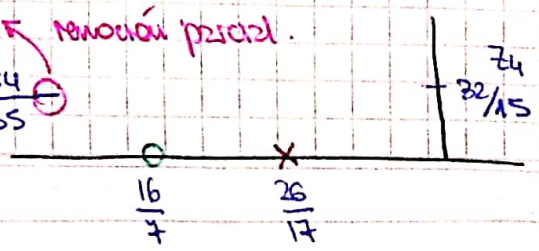
$$Y_4 = \frac{15(s^2+4s+3) - \left[\frac{45}{52}s^2 + \frac{300}{91}s\right]7}{7(s+16/7)(s+6)} = \frac{15s^2+60s+45-\frac{525}{52}s^2-\frac{300}{13}s}{7(s+16/7)(s+6)}$$

$$Y_4 = \frac{\frac{255}{52}s^2+\frac{480}{13}s+45}{7(s+16/7)(s+6)} = \frac{255}{364}\cdot\frac{s^2+\frac{128}{17}s+\frac{156}{17}}{(s+16/7)(s+6)} = \frac{255}{364}\cdot\frac{(s+26/17)(s+6)}{(s+16/7)(s+6)}$$

$$Y_4 = \frac{255}{364}\cdot\frac{s+26/17}{s+16/7}$$

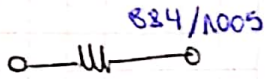
$Y_4(0) = \frac{15}{32}$ $Y_4(\infty) = \frac{255}{364}$





$$Z_6(s) = Z_4(s) - k_{\infty}$$

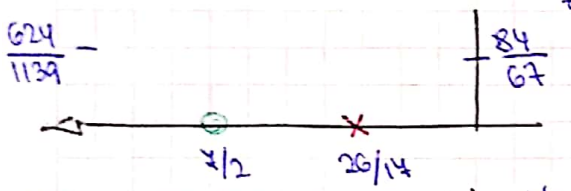
$$k_{\infty} = Z_4(-7/2) = \frac{364}{255}\,\frac{(-7/2 + 16/7)}{(-7/2 + 26/17)} = \frac{884}{1005}$$



$$Z_6(s) = \frac{364}{255}\,\frac{(s + 16/7)}{(s + 26/17)} - \frac{884}{1005} = \frac{1005(364s + 832) - 884 \cdot 255 \cdot (s + 26/17)}{255 \cdot 1005\,(s + 26/17)}$$

$$Z_6(s) = \frac{365820\,s + 836160 - 225420\,s - 344760}{256275\,(s + 26/17)} = \frac{140400\,s + 491400}{256275\,(s + 26/17)}$$

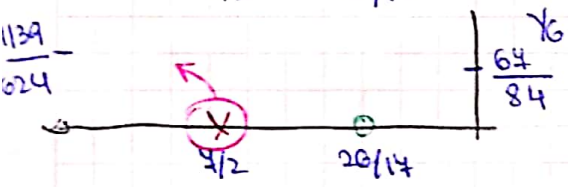
$$Z_6(s) = \frac{624}{1139}\,\frac{(s + 7/2)}{(s + 26/17)} \qquad Z_6(0) = 84/67 \qquad Z_6(\infty) = \frac{624}{1139}$$



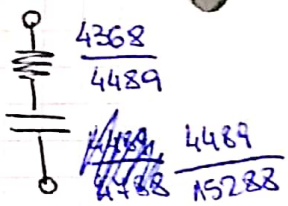
Z_6

$$k_7 = \lim_{s \to -7/2} \frac{s + 7/2}{s} \cdot Y_6$$

$$k_7 = \lim_{s \to -7/2} \frac{(s + 7/2)}{s}\,\frac{1139}{624}\,\frac{(s + 26/17)}{(s + 7/2)}$$

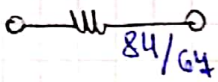


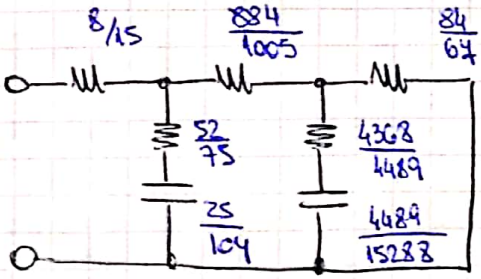
$$k_7 = \frac{1139}{624}\,\frac{(-7/2 + 26/17)}{(-7/2)} = \frac{4489}{4368}$$



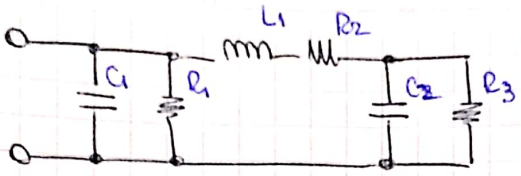
$$Y_8 = Y_6 - \frac{s\,\frac{4489}{15288}}{s + 7/2} = \frac{1139}{624}\,\frac{s + 26/17}{s + 7/2} - \frac{s \cdot \frac{4489}{4368}}{s + 7/2} = \frac{1139\,s + 1742 - \frac{4489}{4}\,s}{624(s + 7/2)}$$

$$Y_8 = \frac{3484/4\,s + 1742}{624(s + 7/2)} = \frac{3484}{4 \cdot 624}\,\frac{(s + 7/2)}{(s + 7/2)} = \frac{64}{84}$$





(2)



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

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

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

$s^3+3s^2+4s+5 \;\big|\; s^2+s+1$

s^3+s^2+s — s

$2s^2+6s+5$

$2s^2+2s+2$ — 2

$s^2+s+1 \;\big|\; 4s+3$

$s^2+\frac{3}{4}s$ — $4s \;\; \frac{1}{4}$

$\frac{1}{4}s+1 \;\big|\; 4s+3$

$\frac{1}{4}s+\frac{3}{16}$ — $\frac{1}{16}$

$4s+3 \;\big|\; \frac{13}{16}$

$4s+3$ — $\frac{64}{13}s$

$3 \;\big|\; \frac{13}{16}$

3 — 0

$\frac{48}{13}$