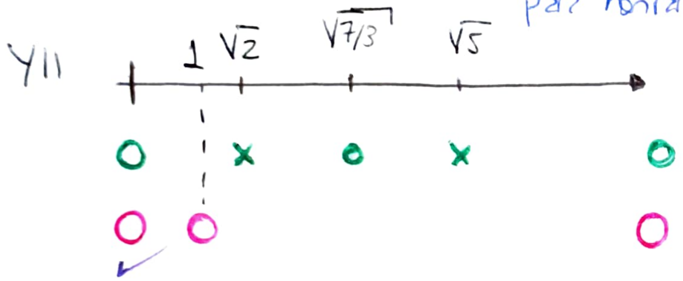
Tarea Semanal 18

$$Y_{11} = \left.\frac{I_2}{V_1}\right|_{V_2=0} \quad \frac{3s\,(s^2+7/3)}{(s^2+2)(s^2+5)} \quad ; \quad Y_{21} = \left.\frac{I_1}{V_1}\right|_{V_2=0} = \frac{s\,(s^2+1)}{(s^2+2)(s^2+5)}$$

$$T(s) = \left.\frac{I_2}{I_1}\right|_{V_2=0} \Rightarrow \frac{Y_{21}}{Y_{11}}$$

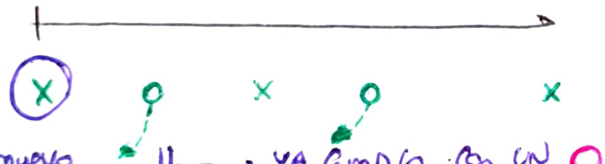
∴ debo sintetizar Y_{11} honrando los (Z o) de transferencia, es decir los (Z o) de Y_{21} en este caso

⇒ Planteo Y_{11}, y veo donde quiero forzar las remociones para honrar los "Z"



→ Z de Y_{21} a forzar

$Z_A = 1/Y_{11}$



Remuevo Parcial ; ya cumplo con un o y dejo el o impuesto en 1

$$\left.\frac{s^4+7s^2+10}{3s(s^2+7/3)}-\frac{k_0}{s}\right| = 0 \qquad s=j\omega=j$$

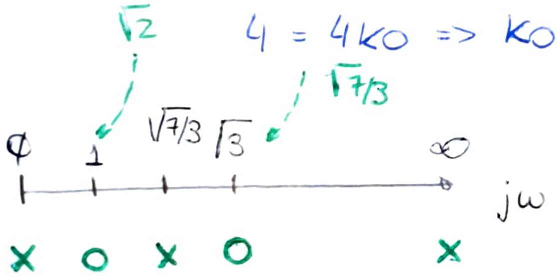
$$s^4+7s^2+10-3k_0s^2-7k_0=0$$
$$j^4+(7-3k_0)j^2+10-7k_0=0$$
$$1-(7-3k_0)+10-7k_0=0$$
$$11=7-3k_0+7k_0$$
$$4=4k_0 \Rightarrow k_0=1 \quad \therefore$$

Verifico

$$\frac{s^4+7s^2+10}{3s(s^2+7/3)}-\frac{1}{s}$$
$$\frac{s^4+7s^2+10-3s^2-7}{3s(s^2+7/3)}$$
$$\frac{s^4+4s^2+3}{3s(s^2+7/3)} \Rightarrow OK$$

$ZB=$  1

$$Zc=\frac{(s^2+1)(s^2+3)}{3s(s^2+7/3)}$$

Zc 

Aún puedo porque remoción parcial

Lo saco como foster

Yc 

Remuevo TOTAL

ambos son $\mathbb{C}$ conj $\Rightarrow$ se cancelarán

$$Yc(s)=\frac{3s(s^2+7/3)}{(s^2+1)(s^2+3)}$$

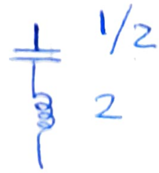
$$\frac{2k_i\,s}{s^2+\omega_i^2}=\angle_{s\to-\omega_i^2} \quad Y(s)$$

$$2k_i=\angle_{s^2\to-1}\ \frac{\cancel{(s^2+1^2)}}{\cancel{s}}\ \frac{3\cancel{s}(s^2+7/3)}{\cancel{(s^2+1^2)}(s^2+3)}$$

$$2k_i=\frac{\cancel{3}\ \frac{4}{\cancel{3}}}{2}=2$$

$$\Rightarrow Ye(s)=Yc(s)-\frac{2\ s}{s^2+(1)^2}$$

$$\frac{3s(s^2+7/3)}{(s^2+1)(s^2+3)}-\frac{2s}{s^2+1}$$



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

Ye


=> YA removí en Φ, 1 → Me falta en ∞ ③

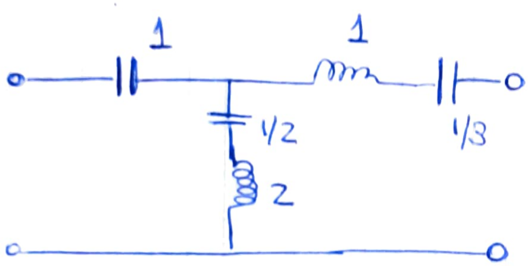
$$\begin{array}{l|l} \$^2+3 & \$ \\ \hline \$^2 & \$ \\ \hline 3 & \end{array}$$

1

$$\frac{3}{\$}$$

Zg


↳ es un capacitor de 1/3



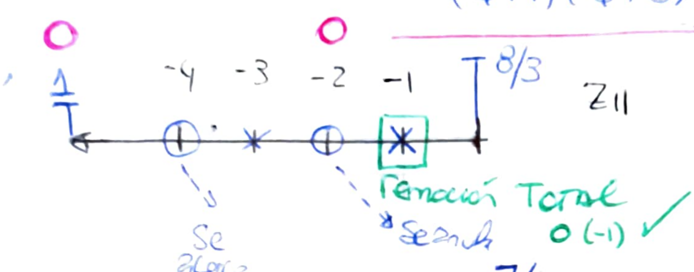
y termino en serie => puedo medir $\Big|_{V_2=\Phi}$ ✓

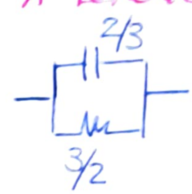
(2) $T(s) = \left.\frac{V_2}{V_1}\right|_{I_2=0} = \frac{K(s+1)}{(s+2)(s+4)}$

Yo sé que $T(s) = \frac{Z_{21}}{Z_{11}} = \frac{-Y_{21}}{Y_{22}}$ → tengo 2 opciones para sintetizar

• Parámetros Z $\quad \frac{Z_{21}}{Z_{11}} = \frac{N/D}{P/D}$, $\quad Z(0) > Z(\infty)$

Adopto $Z_{11} = \frac{(s+2)(s+4)}{(s+1)(s+3)}$ ⟶ A remover para hallar Z_{21}

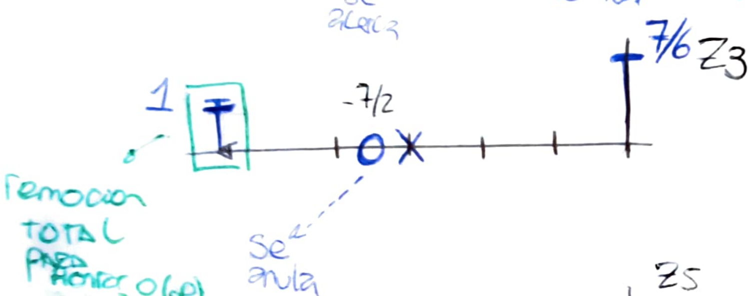




$\frac{k_i}{s+\sigma_i} = \lim_{s \to -\sigma_i} Z_{11}$

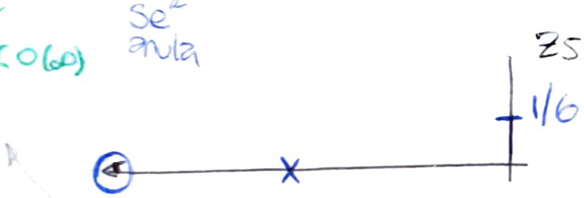
$k_i = \lim_{s \to (-1)} (s+1)\frac{(s+2)(s+4)}{(s+1)(s+3)}$

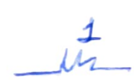
$k_i = 3/2$



$Z_3(s) = \frac{s^2+6s+8}{(s+1)(s+3)} - \frac{3/2}{s+1} = \frac{s^2+6s+8-\frac{3}{2}s-\frac{9}{2}}{(s+1)(s+3)}$

$Z_3(s) = \frac{s+7/2}{s+3}$

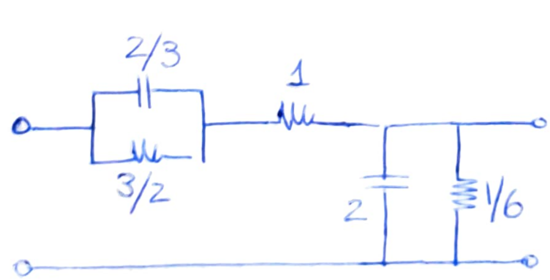


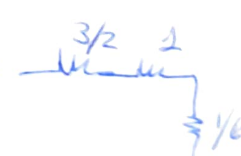


$\Rightarrow Z_5(s) = \frac{s+7/2}{s+3} - 1 = \frac{1/2}{s+3}$

esto ya es fácil luego de sintetizar → si sigo por el 0 faltante debería invertir para remover en ∞

⇒ Saco Y_5 para $\left.\right|_{I_2=0} = 2s + 6$





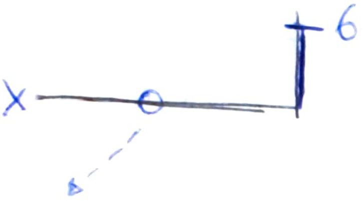
$T(0) = \frac{1/6}{1/6+1+3/2} = \frac{1}{16}$

$= \frac{1/6}{8/3}$

esto no cumple $T(0)$ ...

Veo de remover de a 1

(4)

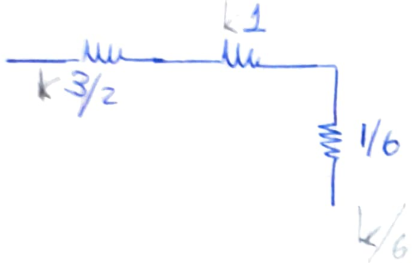


$$Y = \frac{\$+3}{1/2} = 2\$+6 \qquad \$+3 \;\underline{\big|\; 1/2}\quad 2\$$$

$$Y = 2\$+6 - k$$

$$= \underbrace{k\infty}_{2} . \$ + \underbrace{6\infty}_{1/6}$$ => Me queda igual

Sigue dando lo mismo



$$= \frac{1/6}{8/3} = \cancel{\frac{1}{8}} \quad \frac{1/6}{1/6 + 1 + 3/2} \qquad \frac{1}{6} \cdot \frac{3}{8} \quad 1/2$$

$1/6$

debería tener - resistencia

$\frac{3}{2} + \frac{1}{6} +$

$$\frac{k}{8} = \frac{1}{16} \Rightarrow \boxed{k = 1/2} \Rightarrow$$

∘ PARAMETROS Y

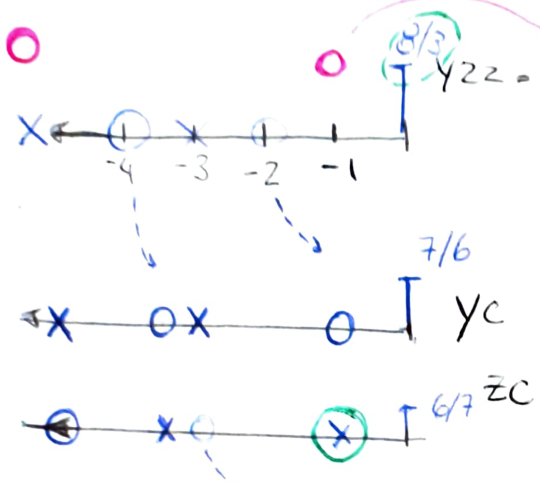
(5)

$$\frac{y_{21}}{y_{22}} = \frac{R/D}{P/D} \Rightarrow \quad y_{22}(s) = \frac{(s+4)(s+2)}{(s+3)} \rightarrow \quad y(\infty) > y(\phi)$$

$\infty > 8/3$

reac

A bajar para obtener la T.F



⇒ buscaré remover parcialmente tal que fuerce un 0 a remover + huella

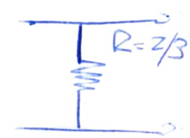
$$\left.\frac{s^2+6s+8}{s+3} - G_0\right|_{s=-1} = \phi$$

$$s^2 + s(6-G_0) + (8-3G_0) = \phi$$

$$1 - 6 + G_\phi + 8 - 3.G_\phi = \phi$$

$$3 = 2G_0 \Rightarrow G_0 = 3/2$$

$\therefore R = 2/3$

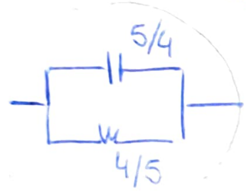


y tengo en //
⇒ $I_{F2}=\phi$

$$\frac{s^2+6s+8}{s+3} - 3/2 = \frac{s^2+6s+8-3/2s-9/2}{s+3}$$

$$y_C(s) = \frac{s^2 + s\,9/2 + 7/2}{s+3} = \frac{(s+1)(s+7/2)}{(s+3)}$$

$y_C(\phi) = 7/6$



$$\frac{k_i}{s+\sigma_i}$$

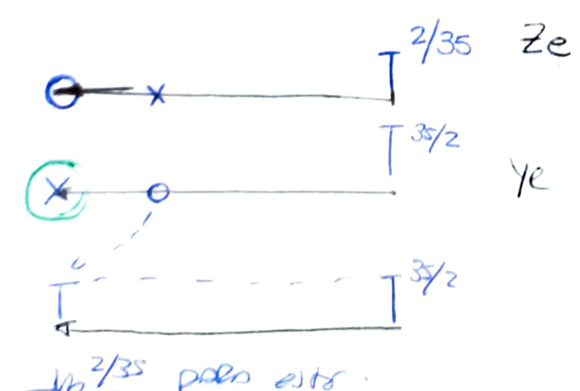
$$\frac{k_i}{s+\sigma_i} = \lim_{s\to-\sigma_i} \quad Z_C(s)$$

$$k_i = \lim_{s\to-1} \cancel{(s+1)} \frac{(s+3)}{\cancel{(s+1)}(s+7/2)}$$

$$k_i = \frac{2}{5/2} = 4/5$$

$$Z_e(s) = Z_C(s) - \frac{4/5}{s+1} = \frac{(s+3)}{(s+1)(s+7/2)} - \frac{4/5}{s+1} = \frac{s+3-4/5.s-14/5}{(s+1)(s+7/2)} = \frac{1/5\,s+1/5}{(s+1)(s+7/2)}$$

$$Z_e(s) = \frac{1/5}{s+7/2}$$



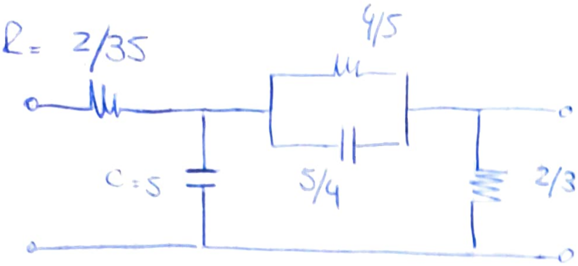
$$s\,k_\infty = \lim_{s\to\infty} \quad Y_e(s)$$

$$k_\infty = \lim \frac{1}{s} \frac{s+7/2}{1/5}$$

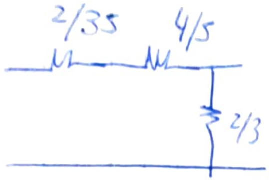
$k_\infty = 5$; $s + 7/2 \,\big|\, \frac{1/5}{5s}$

$7/2$

$$\Rightarrow y_8 = \frac{7/2}{1/5} = 35/2$$



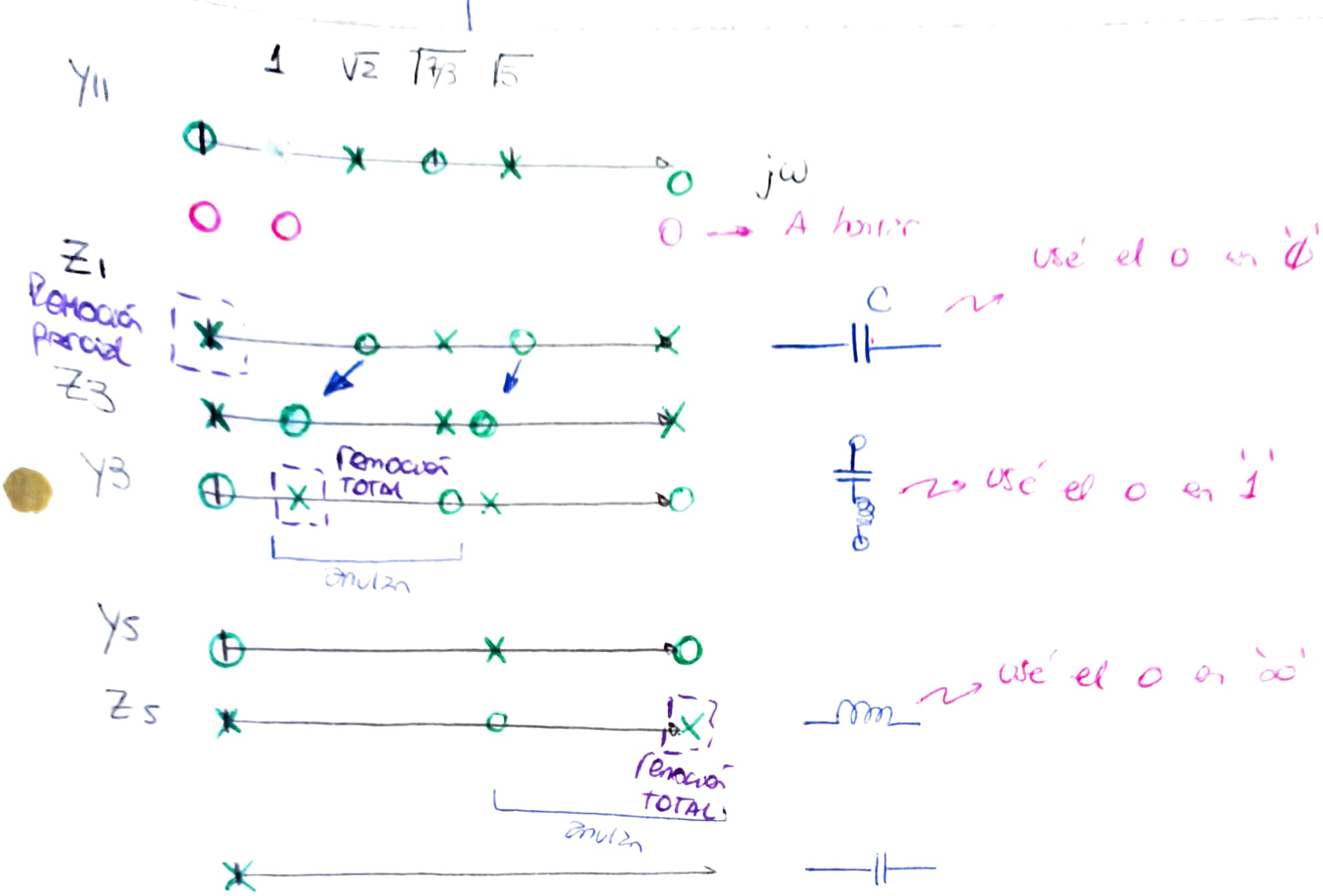
$T(0) = \frac{k}{8}$ =>



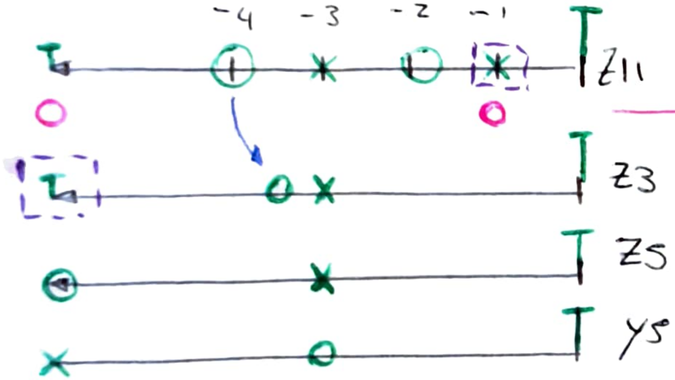
$$\frac{2/3}{2/3 + 2/35 + 4/5} = \frac{2/3}{32/21} = 7/16$$

$$\Rightarrow \frac{k}{8} = \frac{7}{16}$$

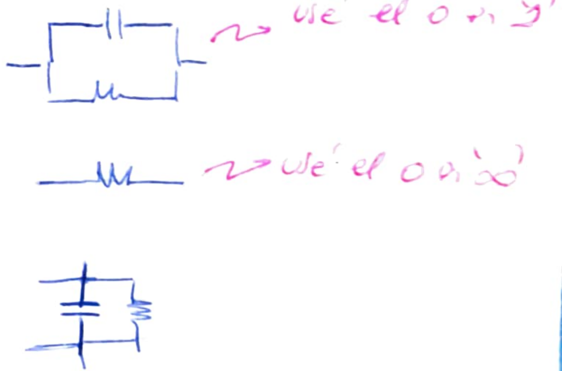
$$\boxed{k = 7/2}$$

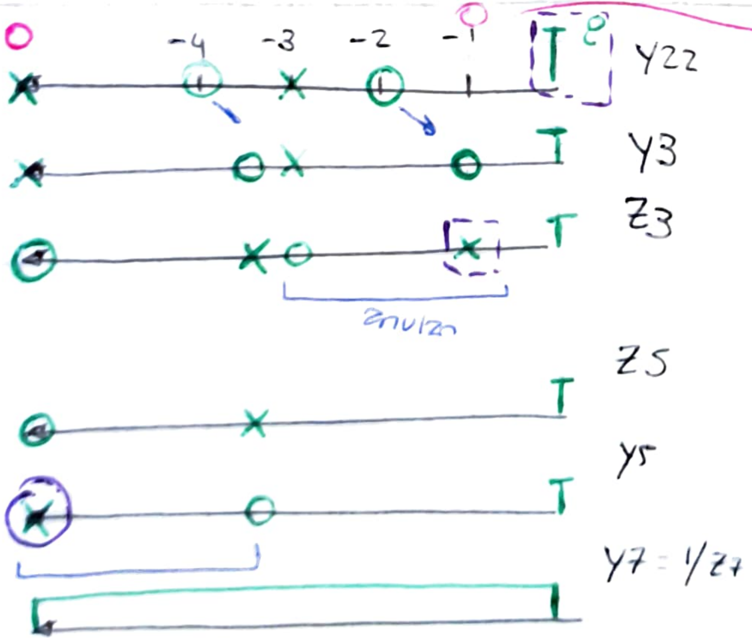


Y11
1
√2
√7/3
√5
jω
A borrar
usé el 0 en 0
C
Z1
Remoción parcial
Z3
Y3
Remoción TOTAL
anulan
usé el 0 en 1
Y5
usé el 0 en ∞
Z5
Remoción TOTAL
anulan



A borrar




-4
-3
-2
-1
Y22
Y3
Z3
anulan
Z5
Y5
Y7 = 1/Z7