HOJA N°

FECHA

Tarea Semanal 9

1) $Z(\$) = \dfrac{(\$^2+3)(\$^2+1)}{\$(\$^2+2)}$

a) Sintetizar $Z(\$)$ mediante Foster Paralelo

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

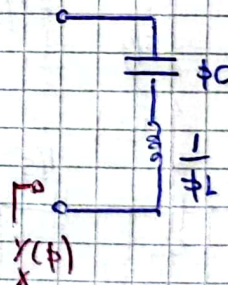
$$Y(\$) = \frac{2K_1 \cdot \$}{\$^2+1} + \frac{2 \cdot K_2 \$}{\$^2+3}$$

$$2K_1 = \lim_{\$^2 \to -1} \frac{\$^2+1}{\$} Y(\$) = \frac{-1+2}{-1+3} = 1/2 \longrightarrow K_1 = 1/4$$

$$2K_2 = \lim_{\$^2 \to -3} \frac{\$^2+3}{\$} Y(\$) = \frac{-3+2}{-3+1} = 1/2 \longrightarrow K_2 = 1/4$$

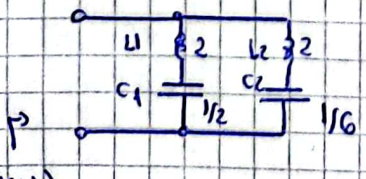
Auxiliar

$$Y(\$) = \frac{2K\$}{\$^2+\omega^2} = \frac{1}{\frac{\$}{2K} + \frac{\omega^2}{2K\$}} = \frac{1}{\frac{1}{\left(\frac{2K}{\$}\right)} + \frac{1}{\left(\frac{2K\$}{\omega^2}\right)}}$$



$$C = \frac{2K}{\omega^2} \qquad L = \frac{1}{2K}$$

Síntesis



$$L_1 = \frac{1}{2 \cdot 1/4} = 2 \qquad L_2 = \frac{1}{2 \cdot 1/4} = 2$$

$$C_1 = \frac{2 \cdot 1/4}{1} = 1/2 \qquad C_2 = \frac{2 \cdot 1/4}{3} = 1/6$$

NOTA

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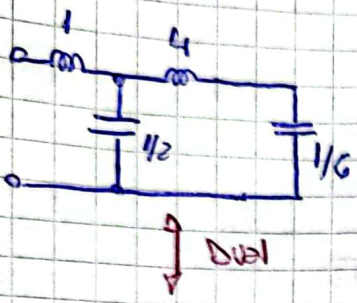
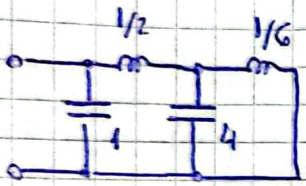
b) Resuelto con Cauer 1 → Pasa Bajos

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



Dual



$s^4+4s^2+3 \;\big|\; s^3+2s$ → $\frac{1}{s}$ (1/2)

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

$2s^2+3 \;\big|\; s^3+2s$ → $\frac{s}{2}$

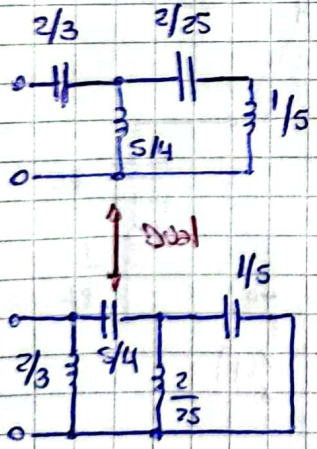
$s^3+\frac{3}{2}s \;\big|\; 2s^2+3$ → $\frac{2}{s}$ (4)

$2s^2+0 \;\big|\; \frac{s}{2}$ → $\frac{1}{6}s$ (1/6)

$3 \;\big|\; 4s$ → $\frac{4}{3}s$

0

Resuelto por Cauer 2 → Pasa Altos



$3+4s^2+s^4 \;\big|\; 2s+s^3$ → $\frac{3}{2s}$ (2/3)

$3+\frac{3}{2}s^2 \;\big|\; 2s+s^3$ → $\frac{4}{5}s$ (5/4)

$\frac{5}{2}s^2+s^4 \;\big|\; 2s+\frac{4}{5}s^3$ → $\frac{25}{2s}$ (2/25)

$\frac{5}{2}s^2+s^4 \;\big|\; \frac{1}{5}s^3$ → $\frac{1}{s}$ (1/5)

$s^4 \;\big|\; \frac{5}{2}s$

$\frac{1}{5}s^3 \;\big|\; s^4$ → $\frac{1}{5}s$

0

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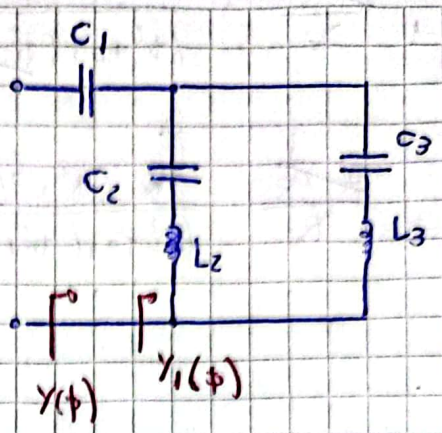
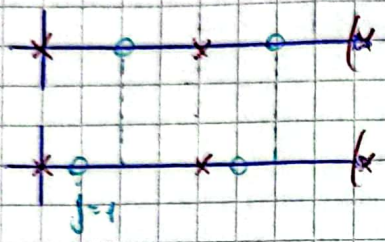
2) $Y(\$) = \dfrac{3\$\,(\$^2 + 7/3)}{(\$^2+2)(\$^2+5)}$



① L_2 y C_2 Resuman a $\frac{1}{3\$}$

② Remuevo C1 Paralelo para que me quede el zero en $w=1$



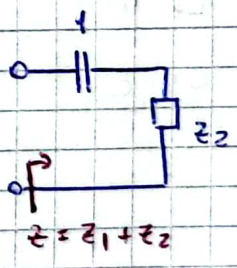
$\frac{1}{Y} = Z \longrightarrow Z - Z_1 = Z_2$

$(Z - Z_1)\Big|_{\$=j1} = 0$

$\left(Z - \frac{K_0}{\$}\right)\Big|_{\$=j1} = 0$

$K_0 = Z \cdot \$\Big|_{\$=j1} = \dfrac{(\$^2+2)(\$^2+5)}{3\$(\$^2+7/3)} \cdot \$\Big|_{\$=j1} = \dfrac{1 \cdot 4}{3 \cdot \frac{4}{3}} = 1$

$Z_2 = Z - Z_1 = Z - \dfrac{K_0}{\$} = \dfrac{(\$^2+2)(\$^2+5)}{3\$(\$^2+7/3)} - \dfrac{1}{\$}$



$Z_2 = \dfrac{\$^4 + 7\$^2 + 10 - 3\$^2 - 7}{3\$(\$^2+7/3)} = \dfrac{\$^4 + 4\$^2 + 3}{3\$(\$^2+7/3)}$

③ Descompongo Z_2 en dos admitancias en paralelo

$Y_2 = \dfrac{3\$(\$^2+7/3)}{\$^4 + 4\$^2 + 3} = \dfrac{3\$(\$^2+7/3)}{(\$^2+3)(\$^2+1)}$

$Y_2 = \dfrac{2k_1\$}{\$+1} + \dfrac{2k_2 \cdot \$}{\$+3}$

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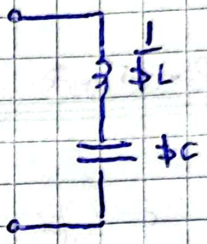
$$2K_1 = \lim_{s^2 \to -1} \frac{s^2+1}{s} \cdot \frac{3s\,(s^2+7/3)}{(s^2+3)(s^2+1)} = \frac{4}{2} = 2 \rightarrow K_1 = 1$$

$$2K_2 = \lim_{s^2 \to -3} \frac{s^2+3}{s} \cdot \frac{3s\,(s^2+7/3)}{(s^2+3)(s^2+1)} = \frac{-2}{-2} = 1 \rightarrow K_2 = 1/2$$

Auxiliar

$$\frac{2Ks}{s^2+\omega^2} = \frac{1}{\frac{s}{2K} + \frac{\omega^2}{2Ks}} = \frac{1}{\frac{1}{\frac{2K}{s}} + \frac{1}{\frac{2Ks}{\omega^2}}}$$



$$C = \frac{2K}{\omega^2} \qquad L = \frac{1}{2K}$$

Sintetizo

$K = 1 \quad \omega^2 = 1$

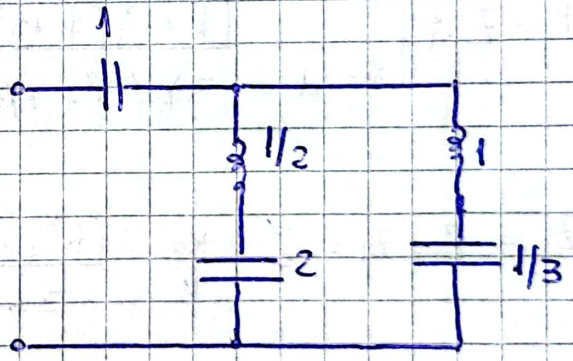
$L = 1/2$

$C = C$

$K = 1/2 \quad \omega^2 = 3$

$L = 1$

$C = 1/3$



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