Ts.

①

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

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

①.

$$\lim_{s^2 \to 3} Y(s) = \frac{2k_1 s}{s^2+3}.$$

$$\lim_{s^2 \to 3} \frac{(s^2+2)}{(s^2+1)} = 2k_1 = \frac{1}{2}.$$

②

$$\lim_{s^2 \to -1} Y(s) = \frac{2k_2 s}{s^2+1}$$

$$\lim_{s^2 \to -1} \frac{s^2+2}{s^2+3} = 2k_2 = \frac{1}{2}$$

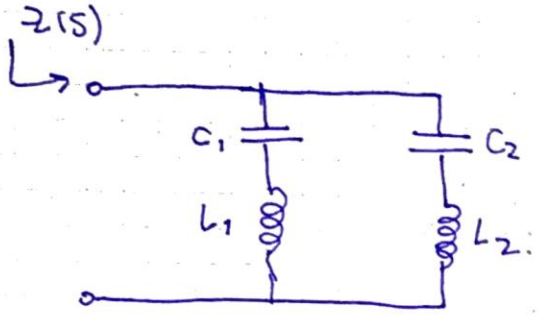
$$\therefore Y(s) = \frac{1}{2}\left[\frac{s}{s^2+3} + \frac{s}{s^2+1}\right]$$

$$Y_1 = \frac{s}{2s^2+6} \Rightarrow Z_1 = 2s + \frac{6}{s} \rightarrow L_1 = 2$$

$$C_2 = 1/6.$$

$$Y_2 = \frac{s}{2s^2+2} \Rightarrow Z_2 = 2s + \frac{2}{s} \rightarrow L_2 = 2$$

$$C_2 = 1/2$$



⑥ Cauer ①.

$(s^2+3)(s^2+1)$

s^4+4s^2+3 | s^3+s2

s^4+s^2 | s

s^3+2s | $2s^2+3$

$s^3+\frac{3}{2}s$ | $s/2$

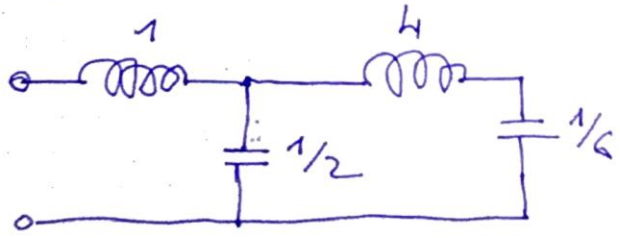
$2s^2+3$ | $\frac{1}{2}s$

$2s^2+0$ | $4s$

$s\frac{1}{2}$ | 3

$s/2$ | $s\frac{1}{6}$

0



Cauer ②

$3 + 4s^2 + s^4 \quad | \quad 2s + s^3$

$3 + \frac{3}{2}s^2 \qquad \frac{3}{2}s$

$0 \quad \frac{5}{2}s^2 + s^4 \quad | \quad 2s + s^3$

$2s + \frac{4}{5}s^3$

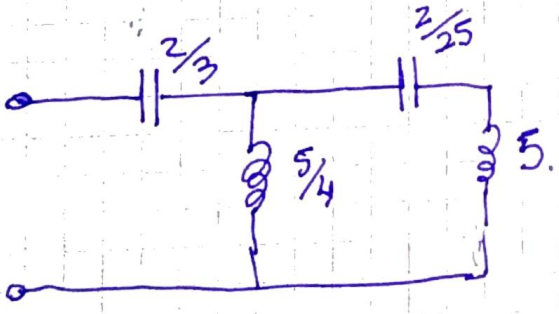
$\frac{4}{5}s \qquad s^2\frac{5}{2} + s^4 \quad | \quad \frac{1}{5}s^3$

$s^2\frac{5}{2} + \qquad \frac{25}{2}s$

$\frac{1}{5}s^3 \qquad s^4$

$\frac{1}{5}s^3 \qquad \frac{1}{5}s$

0



(2)

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

Tengo que retirar parcialmente un capacitor. De modo que la impedancia restante tenga un polo en ①.

$$\therefore \lim_{s^2\to -1} Z(s) = \lim_{s^2\to -1} Z_A(s) + \lim_{s^2\to -1} \frac{K_0'}{s}$$

$$K_0' = \lim_{s^2\to -1} \frac{3s^2 + (s^2 + 7/3)}{(s^2+2)(s^2+5)} = \frac{-3(4/3)}{4}$$

$K_0' = 1 \rightarrow$ El primer capacitor vale 1.

Busco la impedancia restante.

$$Z_B = Z(s) - \frac{1}{s} = \frac{s^4 + 7s^2 + 10}{3s^2 + 7s} - \frac{1}{s}.$$

$$Z_B(s) = \frac{s^4 + 7s^2 + 10 - 3s^2 - 7}{3s^3 + 7s}.$$

$$Z_B(s) = \frac{s^4 + 4s^2 + 3}{3s^3 + 7s} = \frac{(s^2+1)(s^2+3)}{3s\,(s + 7/3)}$$

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

Ahora podemos sacar el polo en $|1|$ y $|\sqrt{3}|$.

$$\lim_{s^2\to -1} Y_B(s) = \frac{2k_1 s}{s^2+1} \Rightarrow \lim_{s^2\to -1} \frac{3s^2+7}{s^2+3} = 2k_1$$

$$2k_1 = 2.$$

$$\lim_{s^2\to -3} Y_B(s) = \frac{2k_2 s}{s^2+3} \Rightarrow \lim_{s^2\to -3} \frac{3s^2+7}{s^2+1} = 2k_2$$

$$2k_2 = 1.$$

$$\therefore \quad Y_B = \frac{2s}{s^2+1} + \frac{s}{s^2+3}.$$

$C_1 = 2$ $\qquad$ $C_2 = 1/3$

$L_1 = 1/2$ $\qquad$ $L_2 = 1$

Circuito: