

$$T(s) = \frac{V_2}{I_1} = \frac{k \cdot s}{s^3 + 2s^2 + 2s + 1}$$

$$I_2 = -\frac{V_2}{R_L}$$

$$Z: \begin{cases} V_1 = Z_{11} I_1 + Z_{12} I_2 \\ V_2 = Z_{21} I_1 + Z_{22} I_2 \end{cases}$$

$$V_2 = Z_{21} I_1 + Z_{22} \left(-\frac{V_2}{R_L} \right) \rightarrow V_2 \left(1 + \frac{Z_{22}}{R_L} \right) = Z_{21} I_1 \rightarrow T(s) = \frac{Z_{21}}{1 + Z_{22}/R_L}$$

Normalizando imp. ($R_L = 1$) $\rightarrow T(s) = \frac{Z_{21}}{1 + Z_{22}}$ Z_{21} : num $\{T(s)\}$ impor \rightarrow dividido por por $\{num\{T(s)\}\}$

$$Z_{21} = \frac{ks}{2s^2 + 1} \quad \wedge \quad Z_{22} = \frac{s^3 + 2s}{2s^2 + 1} = \frac{s(s^2 + 2)}{2(s^2 + 1/2)}$$

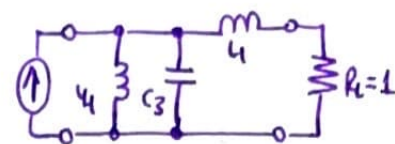
$T(s)$ \rightarrow $\begin{array}{c} \text{X} \quad \text{X} \\ 1 \quad 2 \end{array} \rightarrow (0)^2 \rightarrow$ \rightarrow $\begin{array}{c} \text{num} \{T(s)\} \\ \text{den} \{T(s)\} \end{array}$ \rightarrow $\begin{array}{c} 2 \text{ en } \infty \\ 1 \text{ en } 0 \end{array}$

Z_{22} \rightarrow $\begin{array}{c} \text{X} \quad \text{O} \\ i\sqrt{1/2} \quad i\sqrt{2} \end{array} \rightarrow$ $\begin{array}{c} \text{X} \\ L_1 \end{array}$

Z_2 \rightarrow $\begin{array}{c} \text{X} \\ 0 \end{array} \rightarrow$ $\begin{array}{c} \text{O} \\ C_3 \end{array}$

Y_2 \rightarrow $\begin{array}{c} \text{X} \quad \text{O} \\ 0 \end{array} \rightarrow$ $\begin{array}{c} \text{X} \\ L_4 \end{array}$

Y_4 \rightarrow $\begin{array}{c} \text{X} \\ 0 \end{array} \rightarrow$ $\begin{array}{c} \text{X} \\ L_4 \end{array}$



Síntesis analítica:

$$\lim_{s \rightarrow \infty} sL_1 = \lim_{s \rightarrow \infty} Z_{22} \rightarrow L_1 = \lim_{s \rightarrow \infty} \frac{Z_{22}}{s}$$

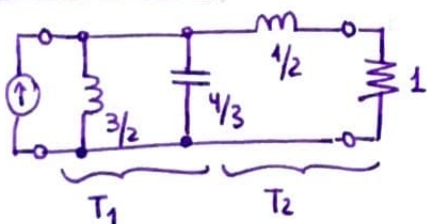
$$L_1 = \lim_{s \rightarrow \infty} \frac{1}{2} \frac{(s^2 + 2)}{(s^2 + 1/2)} = \frac{1}{2}$$

$$Z_2 = Z_{22} - sL_1 = \frac{s^3 + 2s}{2(s^2 + 1/2)} - \frac{s}{2} = \frac{s^3 + 2s - (s^3 + s/2)}{2(s^2 + 1/2)} = \frac{3}{4} \frac{s}{s^2 + 1/2}$$

$$Y_2 = \frac{4}{3} \frac{s^2 + 1/2}{s} \quad \lim_{s \rightarrow \infty} sC_3 = \lim_{s \rightarrow \infty} Y_2 \rightarrow C_3 = \lim_{s \rightarrow \infty} \frac{Y_2}{s} = \lim_{s \rightarrow \infty} \frac{4}{3} \cdot \frac{s^2 + 1/2}{s^2} = \frac{4}{3}$$

$$Y_4 = Y_2 - sC_3 = \frac{4s^2 + 2}{3s} - \frac{4s}{3} = \frac{2}{3s} = \frac{1}{sL_4} \rightarrow L_4 = \frac{3}{2}$$

Red con valores:



$$T_1 = \begin{pmatrix} 1 & 0 \\ \frac{4s}{3} + \frac{2}{3s} & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ \frac{4s^2 + 2}{3s} & 1 \end{pmatrix}$$

$$T_2 = \begin{pmatrix} 1 + \frac{s}{2} \cdot 1 & \frac{s}{2} \\ 1 & 1 \end{pmatrix} = \begin{pmatrix} \frac{s+2}{2} & \frac{s}{2} \\ 1 & 1 \end{pmatrix}$$

$$T_2: \begin{array}{c} \text{X} \quad \text{O} \\ \text{O} \quad \text{X} \end{array} \quad T_2 = \begin{pmatrix} 1 + \frac{Z_1}{Z_2} & Z_1 \\ \frac{1}{Z_2} & 1 \end{pmatrix}$$

$T_T = T_1 \cdot T_2$ $T: \begin{cases} V_1 = AV_2 + B(-I_2) \\ I_1 = CV_2 + D(-I_2) \end{cases} \rightarrow T(s) = \frac{V_2}{I_1} = \frac{1}{C} \Big|_{(-I_2)=0}$ \rightarrow posible según los cuadripolos elegidos

$$C = \frac{4s^2 + 2}{3s} \cdot \frac{s+2}{2} + 1 \cdot 1 = \frac{4s^3 + 8s^2 + 2s + 4}{6s} + \frac{6s}{6s} = \frac{4s^3 + 8s^2 + 8s + 4}{6s} = \frac{2}{3} \cdot \frac{s^3 + 2s^2 + 2s + 1}{s} \rightarrow \frac{1}{C} = T(s) \text{ se cumple para } k = 3/2$$