HOJA Nº

FECHA

Punto 2 c

Para conocer la transferencia de tensiones v_o/v_i mediante la MAI, se plantea la siguiente ecuación:

$$Av_{03}^{23} = sgn(0-3) \cdot sgn(2-3) \cdot \frac{Y_{23}^{03}}{Y_{03}^{03}}$$

$$Y_{23}^{03} = \det \begin{pmatrix} -1/sL_1 & 0 \\ \frac{1}{sL_1} + sC_2 + \frac{1}{sL_3} & -1/sL_3 \end{pmatrix}$$

$$\boxed{Y_{23}^{03} = \frac{1}{s^2 L_1 L_3}}$$

$$Y_{03}^{03} = \det \begin{pmatrix} \frac{1}{sL_1} + sC_2 + \frac{1}{sL_3} & -1/sL_3 \\ -1/sL_3 & \frac{1}{sL_3} + \frac{1}{R} \end{pmatrix}$$

$$Y_{03}^{03} = \left(\frac{1}{sL_1} + sC_2 + \frac{1}{sL_3}\right)\left(\frac{1}{sL_3} + \frac{1}{R}\right) - \left(-\frac{1}{sL_3}\right) \cdot \left(-\frac{1}{sL_3}\right)$$

$$Y_{03}^{03} = \frac{1}{s^2 L_1 L_3} + \frac{1}{sL_1 R} + \frac{C_2}{L_3} + \frac{sC_2}{R} + \cancel{\frac{1}{s^2 L_3^2}} + \frac{1}{sL_3 R} - \cancel{\frac{1}{s^2 L_3^2}}$$

$$Y_{03}^{03} = \frac{1}{s^2 L_1 L_3} + \frac{1}{sL_1 R} + \frac{C_2}{L_3} + \frac{sC_2}{R} + \frac{1}{sL_3 R}$$

$$Y_{03}^{03} = \frac{1}{s^2 L_1 L_3}\left(1 + \frac{s^2 L_1 L_3}{sL_1 R} + \frac{s^2 L_1 L_3 C_2}{L_3} + \frac{s^2 L_1 L_3 s C_2}{R} + \frac{s^2 L_1 L_3}{sL_3 R}\right)$$

$$Y_{03}^{03} = \frac{1}{s^2 L_1 L_3} \cdot \left(1 + \frac{sL_3}{R} + s^2 \cdot L_1 C_2 + \frac{s^2 L_1 L_3 C_2}{R} + \frac{sL_1}{R}\right)$$

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$$Y_{03}^{03} = \frac{1}{s^2 L_1 L_3} \cdot \left(\frac{s^3 L_1 L_3 C_2}{R} + s^2 L_1 C_2 + \frac{s\,(L_1 + L_3)}{R} + 1 \right)$$

$$Av_{03}^{23} = \operatorname{sgn}(0-3) \cdot \operatorname{sgn}(2-3) \cdot \frac{Y_{23}^{03}}{Y_{03}^{03}}$$

$$Av_{03}^{23} = (-1)(-1) \cdot \frac{Y_{23}^{03}}{Y_{03}^{03}} = \frac{Y_{23}^{03}}{Y_{03}^{03}}$$

$$Av_{03}^{23} = \frac{\dfrac{1}{s^2 L_1 L_3}}{\dfrac{1}{s^2 L_1 L_3}\left(s^3 \dfrac{L_1 L_3 C_2}{R} + s^2 L_1 C_2 + \dfrac{s\,(L_1 + L_3)}{R} + 1 \right)}$$

$$Av_{03}^{23} = \frac{1}{s^3 \dfrac{L_1 L_3 C_2}{R} + s^2 L_1 C_2 + \dfrac{s\,(L_1 + L_3)}{R} + 1}$$

$$Av_{03}^{23} = \frac{\dfrac{1}{L_1 L_3 C_2 G}}{s^3 + s^2 \cdot \dfrac{L_1 C_2}{L_1 L_3 C_2 G} + \dfrac{s \cdot (L_1 + L_3) G}{L_1 L_3 C_2 G} + \dfrac{1}{L_1 L_3 C_2 G}}$$

$$Av_{03}^{23} = \frac{\dfrac{1}{L_1 L_3 C_2 G}}{s^3 + s^2 \cdot \dfrac{1}{L_3 G} + \dfrac{s\,(L_1 + L_3)}{L_1 L_3 C_2} + \dfrac{1}{L_1 L_3 C_2 G}}$$

<u>Reemplazando los valores</u>: $L_1 = \frac{3}{2}$; $C_2 = 4/3$; $L_3 = 1/2$; $R = 1$

La transferencia queda: $\boxed{T(s) = \dfrac{1}{s^3 + 2s^2 + 3s + 1}}$

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