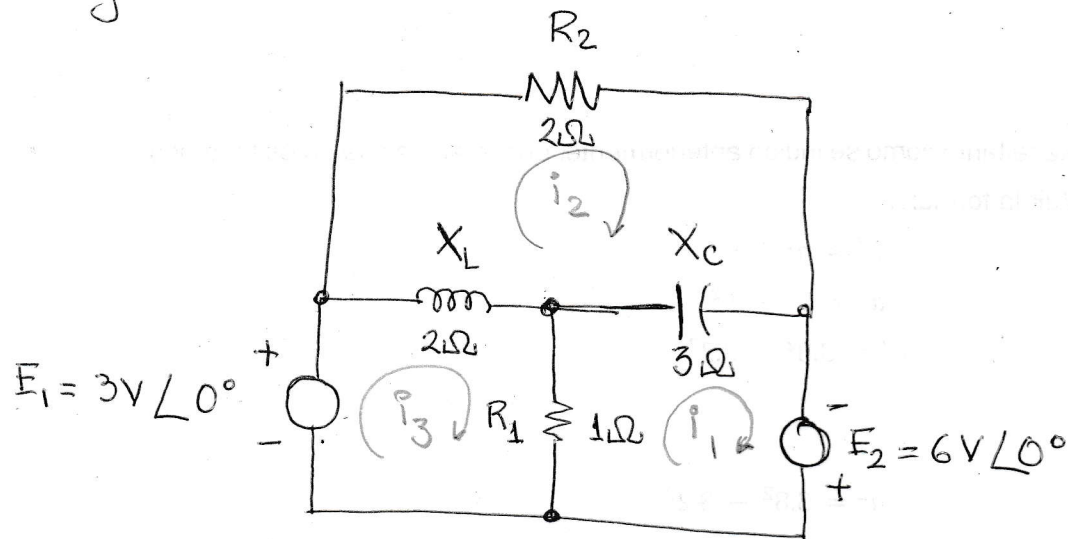


Pregunta 3 Calcula las corrientes de malla

Hoja 1



Corrientes de malla

$$\text{Malla 1} \rightarrow I_1(R_1 + X_C) - I_2 X_C - I_3 R_1 = E_2$$

$$\text{Malla 2} \rightarrow -I_1 X_C + I_2(R_2 + X_L + X_C) - I_3 X_L = 0$$

$$\text{Malla 3} \rightarrow -I_1 R_1 - I_2 X_L + I_3(R_1 + X_L) = E_1$$

Sustitución

$$\begin{bmatrix} (1-j3) & j3 & -1 \\ j3 & (2-j) & -j2 \\ -1 & -j2 & 1+j2 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \end{bmatrix} = \begin{bmatrix} 6 \\ 0 \\ 3 \end{bmatrix}$$

• Determinación del Δ

$$\Delta = (1-j3)[(2-j)(1+j2) - (-j2)^2] - j3[j3(1+j2) - (-1)(-j2)] + (-1)[j3(-j2) + (2-j)]$$

$$\Delta = (17-j21) + (3+j18) + (-8+j) = \underline{12-j2}$$

• Determinación de la corriente 1

Hoja 2

$$I_1 = \frac{\begin{bmatrix} 6 & j3 & -1 \\ 0 & (2-j) & -j2 \\ 3 & -j2 & 1+j2 \end{bmatrix}}{12-j2} = \frac{6[(2-j)(1+j2) - (-j2)^2] - j3[-3(-j2)] - 1[-3(2-j)]}{12-j2}$$

$$I_1 = \frac{48 + j18 + 18 + 6 - j3}{12-j2} = \frac{72 + j15}{12-j2} = \underline{6.04 \text{ A} \angle 21.23^\circ} *$$

Determinación de la corriente 2

$$I_2 = \frac{\begin{bmatrix} (1-j3) & 6 & -1 \\ j3 & \emptyset & -j2 \\ -1 & 3 & 1+j2 \end{bmatrix}}{12-j2} = \frac{(1-j3)[-3(-j2)] - 6[j3(1+j2) - (-1)(-j2)] + (-1)[3 \cdot j3]}{12-j2}$$

$$I_2 = \frac{(18 + j6) + (36 - j6) + (-3 + j3)}{12-j2} = \frac{51 + j3}{12-j2} = \underline{4.20 \text{ A} \angle 12.83^\circ} *$$

Determinación de la corriente 3

$$I_3 = \frac{\begin{bmatrix} (1-j3) & j3 & 6 \\ j3 & (2-j) & \emptyset \\ -1 & -j2 & 3 \end{bmatrix}}{12-j2} = \frac{(1-j3)[3(2-j)] - j3[3(j3)] + 6[(j3)(-j2) - (-1)(2-j)]}{12-j2}$$

$$I_3 = \frac{-3 - j21 + 27 + 48 - 6j}{12-j2} = \frac{72 - j27}{12-j2} = \underline{6.32 \text{ A} \angle -11.09^\circ} *$$