

Usando formato retangular:

$$j := \sqrt{-1}$$

$$\underline{V}(j) := 120$$

$$Z_R(j) := 1$$

$$Z_C(j) := -j \cdot 2$$

$$Z_L(j) := j \cdot 3$$

a) Determinar a impedância total:

$$Z_1(j) := Z_R(j) \quad Z_1(j) = 1$$

$$Z_2(j) := \frac{Z_C(j) \cdot Z_L(j)}{Z_C(j) + Z_L(j)} \quad Z_2(j) = -6i$$

$$Z_T(j) := Z_1(j) + Z_2(j) \quad Z_T(j) = 1 - 6i$$

b) Determinar a corrente total:

$$I_T(j) := \frac{V(j)}{Z_T(j)} \quad I_T(j) = 3.243 + 19.459i$$

c) Calcular a tensão no resistor e no capacitor:

$$V_R(j) := Z_R(j) \cdot I_T(j) \quad V_R(j) = 3.243 + 19.459i$$

$$V_C(j) := V(j) - V_R(j) \quad V_C(j) = 116.757 - 19.459i$$

$$\underline{V}_C(j) := Z_2(j) \cdot I_T(j) \quad V_C(j) = 116.757 - 19.459i$$

d) Calcular a tensão no resistor e no capacitor:

$$I_C(j) := \frac{V_C(j)}{Z_C(j)} \quad I_C(j) = 9.73 + 58.378i$$

e) Calcular a potência (média) fornecida pela fonte:

$$\theta_T := \arg(Z_T(j)) \quad \theta_T = -1.406$$

$$V_{ef} := |V(j)| \quad V_{ef} = 120$$

$$I_{Tef} := |I_T(j)| \quad I_{Tef} = 19.728$$

$$P_T := V_{ef} \cdot I_{Tef} \cdot \cos(\theta_T) \quad P_T = 389.189$$

f) Calcular o fator de potência do circuito:

$$FP := \cos(\theta_T) \quad FP = 0.164$$

$$S_T := V_{ef} \cdot I_{Tef} \quad S_T = 2.367 \times 10^3$$

$$FP := \frac{P_T}{S_T} \quad FP = 0.164$$

Usando formato polar:

$$\angle(\text{mag}, \text{ang}) := \text{mag} \cdot (\cos(\text{ang} \cdot \text{deg}) + i \cdot \sin(\text{ang} \cdot \text{deg}))$$

$$j := \sqrt{-1}$$

$$V := 120 \angle 0$$

$$Z_R := 1 \angle 0$$

$$Z_C := 2 \angle -90$$

$$Z_L := 3 \angle 90$$

a) Determinar a impedância total:

$$Z_1 := Z_R \quad Z_1 = 1$$

$$Z_2 := \frac{Z_C \cdot Z_L}{Z_C + Z_L} \quad Z_2 = -6i$$

$$Z_T := Z_1 + Z_2 \quad Z_T = 1 - 6i$$

b) Determinar a corrente total:

$$I_T := \frac{V}{Z_T} \quad I_T = 3.243 + 19.459i$$

c) Calcular a tensão no resistor e no capacitor:

$$\underline{V}_R := Z_R \cdot I_T \quad V_R = 3.243 + 19.459i$$

$$\underline{V}_C := V - V_R \quad V_C = 116.757 - 19.459i$$

$$\underline{V}_C := Z_2 \cdot I_T \quad V_C = 116.757 - 19.459i$$

d) Calcular a tensão no resistor e no capacitor:

$$\underline{I}_C := \frac{V_C}{Z_C} \quad I_C = 9.73 + 58.378i$$

e) Calcular a potência (média) fornecida pela fonte:

$$\theta_T := \arg(Z_T) \quad \theta_T = -1.406$$

$$\underline{V}_{ef} := |V| \quad V_{ef} = 120$$

$$\underline{I}_{Tef} := |I_T| \quad I_{Tef} = 19.728$$

$$\underline{P}_T := V_{ef} \cdot I_{Tef} \cdot \cos(\theta_T) \quad P_T = 389.189$$

f) Calcular o fator de potência do circuito:

$$\underline{FP} := \cos(\theta_T) \quad FP = 0.164$$

$$\underline{S}_T := V_{ef} \cdot I_{Tef} \quad S_T = 2.367 \times 10^3$$

$$\underline{FP} := \frac{P_T}{S_T} \quad FP = 0.164$$