Question. A capacitor of capacitance $100\ \mu F$ & a ressistance of $100\ ohm$ is connected in series with AC supply of $220\ V, 50\ Hz$. The current leads the voltage by????

Given.

$C = 100\ \mu F\ ;\ R = 100\ ohm;\ u = 220\ V;\ v = 50\ Hz;\ L = 0.$

Find.

$\varphi-?.$

Solution.

For an AC circuit
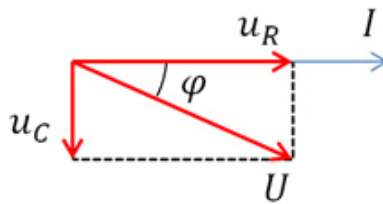
$$\mathrm{tg}\,\varphi = \frac{\omega L - \dfrac{1}{\omega C}}{R}.$$

We get

$$\mathrm{tg}\,\varphi = \frac{\omega L - \dfrac{1}{\omega C}}{R} = \frac{0 - \dfrac{1}{2 \cdot \pi \cdot v \cdot C}}{R} = -\frac{1}{2 \cdot \pi \cdot v \cdot C \cdot R} = -\frac{1}{2 \cdot 3.14 \cdot 50 \cdot 100 \cdot 10^{-6} \cdot 100} = -0.31847.$$

So

$$\varphi = -17.66°.$$

Answer. The current leads the voltage by $17.66°$

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