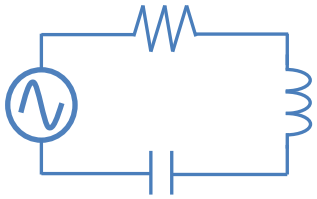
CONCEPT: LRC CIRCUITS IN SERIES



● In a series LRC circuit, the _____ through each element is the same

● In a DC circuit, we would simply say that $V_{LRC} = V_L + V_R + V_C$, since they are all in series

- In an AC circuit, this isn't true, since the maximum voltages occur at different times

● In a series LRC circuit, the MAXIMUM voltage is

- $V_{LRC} =$ _____

● The IMPEDANCE, $\boldsymbol{Z}$, acts like the effective reactance of the circuit.

- In a series LRC circuit, the impedance is $$\boldsymbol{Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}}$$

→ The maximum current produced by the source is given by $i_{MAX} =$ _____

EXAMPLE: A circuit is formed by attaching an AC source in series to an 0.5 H inductor, a 10 Ω resistor and a 500 μF capacitor. If the source operates at a V_{RMS} of 120 V and a frequency of 60 Hz, what is the maximum current in the circuit?

PRACTICE: VOLTAGE IN A SERIES LRC AC CIRCUIT

An AC source operates at an RMS voltage of 70 V and a frequency of 85 Hz. If the source is connected in series to a 20 Ω resistor, a 0.15 H inductor and a 500 μF capacitor, answer the following questions:

a) What is the maximum current produced by the source?
b) What is the maximum voltage across the resistor?
c) What is the maximum voltage across the inductor?
d) What is the maximum voltage across the capacitor?