Combination of Resistors, Inductors, and Capacitors

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ABSTRACT:

This simulation app is one of the best illustrations to understand the connections of electrical components in the circuit and analyze the mixed combination of resistors, capacitors, and inductors in a circuit. We will utilize the app to demonstrate following applications:

I. Understanding the series and parallel connection
II. Impedance, phase angle, power factor etc. in RLC circuits
III. Use the app to solve circuit analysis problems

Series and parallel connection of the same components show totally different equivalent quantities. A mixed connection of these elements in a circuit is used to reach to the required values of impedance. For example, in case of resistors:

$$R_{\text{series}} = R_1 + R_2$$

$$R_{\text{parallel}} = \frac{R_1 R_2}{R_1 + R_2}$$

When we combine multiple components i.e. inductors and capacitors in series RLC circuit, we get the total impedance as follows:

$$Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}$$

Where ω is the input frequency.

We will understand various terms related to RLC circuits and solve circuit analysis problems using this app.

KEYWORDS:

Series and Parallel connection, RLC circuit, Impedance, Phase angle, Power, Circuit analysis.