Seventh Week :

AC Circuits – R-L –C Series

Course Name: Electrical Circuits

Stage: One

Academic Year: 2024–2025

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RLC Series Circuit

An RLC series circuit is an electrical circuit consisting of a resistor (R), an inductor (L), and a capacitor (C) connected in series. The name of the circuit is derived from the initials of the components involved. The arrangement of components may vary, but in this configuration, the components are connected sequentially.

This type of circuit forms a harmonic oscillator for current and resonates similarly to an LC circuit. The addition of the resistor causes damping of these oscillations and reduces the peak resonance frequency.

Objective

The experiment aims to investigate the electrical characteristics of a series-connected RLC circuit. It also seeks to explore the relationship between the input frequency f and the impedance Z of the circuit.

Applications

RLC circuits have a wide range of applications, such as in oscillator circuits. Radio and television receivers use RLC combinations to tune into a narrow frequency range from surrounding radio waves. In this context, the circuit is often referred to as a **tuned circuit**. An RLC circuit can be configured as:

A **band-pass filter**
A **band-stop filter**
A **low-pass filter**
A **high-pass filter**

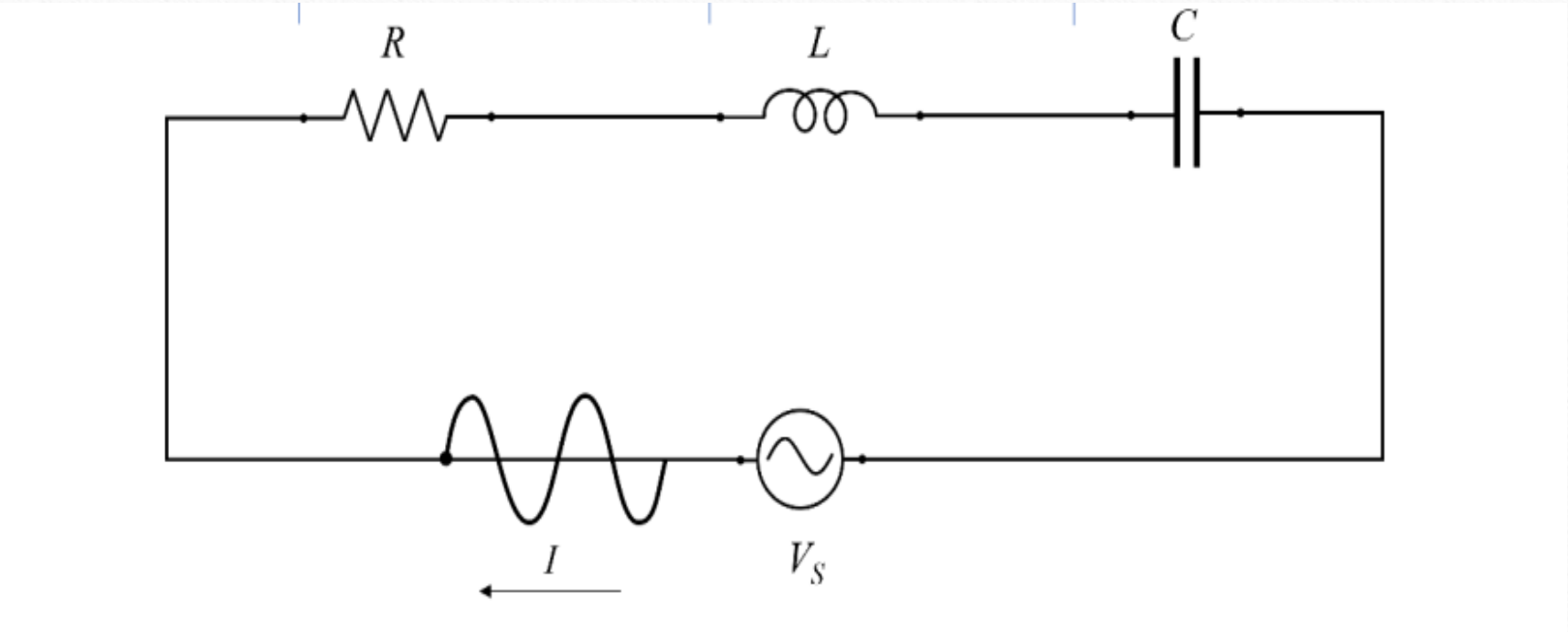

Figure 1

Illustrates the equivalent RLC series circuit and the voltages across each individual component.

Thank you