Sixth Week :

AC Circuits – R-L Series

Course Name: Electrical Circuits

Stage: One

Academic Year: 2024–2025

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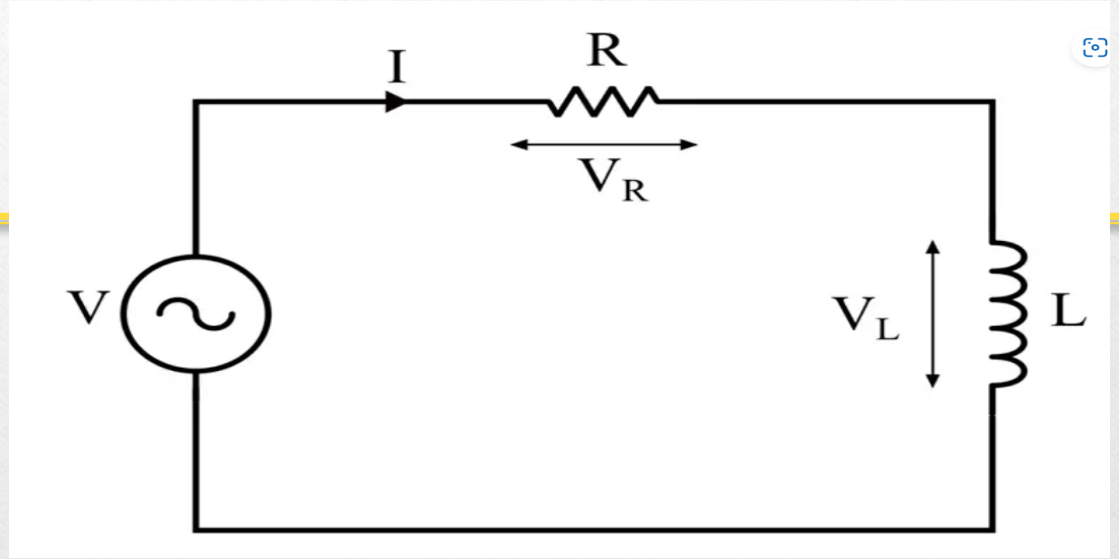
What is an R-L Series Circuit?

An R-L series circuit is an alternating current (AC) circuit that consists of two fundamental components connected in series: a resistor (R) and an inductor (L). A common example of an R-L series circuit is the winding of an electric motor.

Basic Concept

An R-L series circuit is an AC circuit composed of a resistor and an inductor connected in series.

A typical R-L circuit is illustrated in the following diagram.



Voltage Equation in an R-L Series Circuit

The voltage across the circuit can be expressed using the algebraic sum of the voltage drops across each component. Here

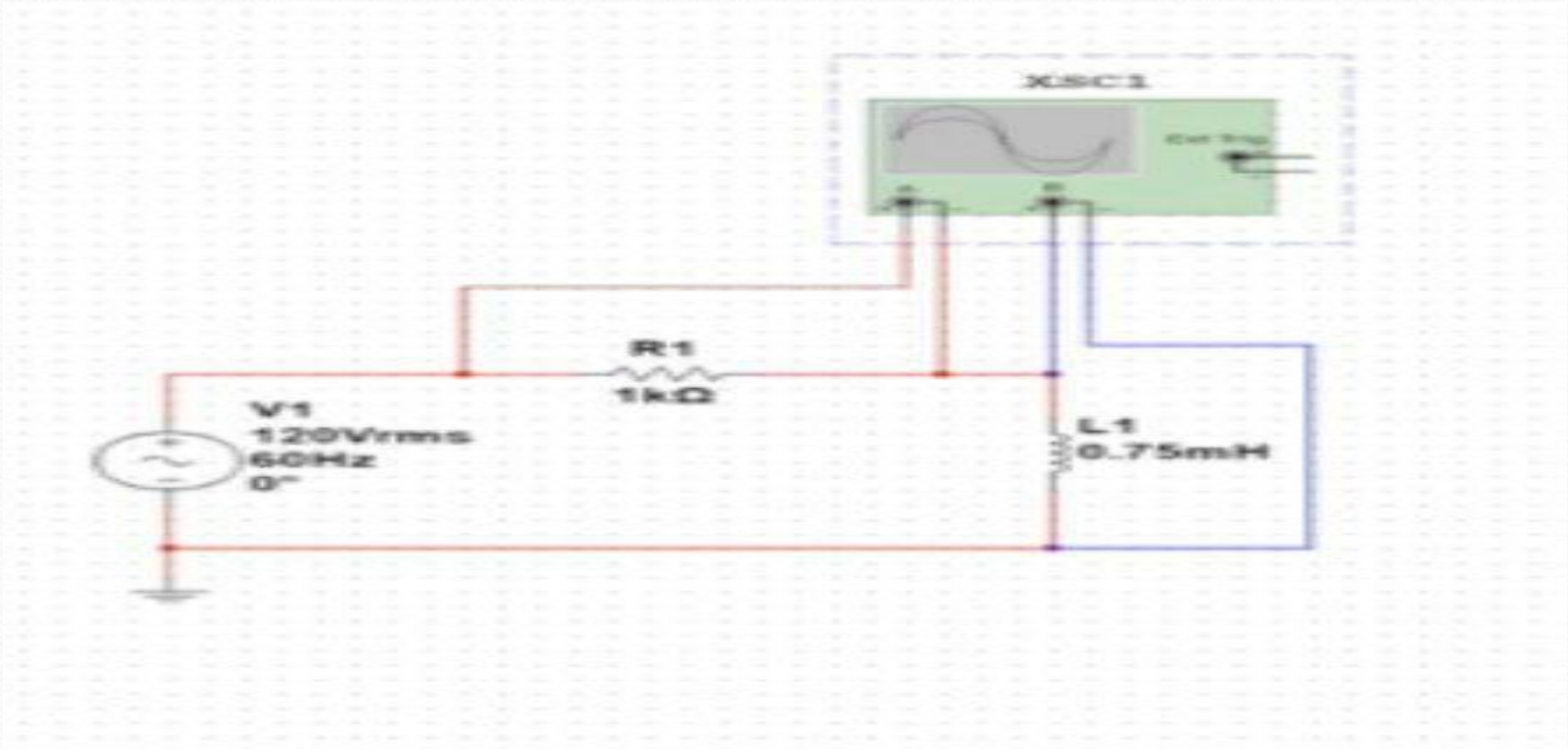
$$V = V_R + V_L$$

•VVV is the RMS (Root Mean Square) value of the supply voltage.
•VR is the RMS voltage drop across the resistor R.
•VL is the RMS voltage across the inductor L.

The voltage drop across the resistor is given by:

$$V_R = i \times R$$

The diagram shows a circuit consisting of a resistor and an inductor connected in series.



Thank you