

Lab 5: AC Measurements

Objective

In this lab, you will learn how to

- use an oscilloscope to measure AC voltages.
- use an oscilloscope to calculate the phase difference between two voltages.

Pre-Lab

Solve the following circuit and the current and voltage phasor for each element.

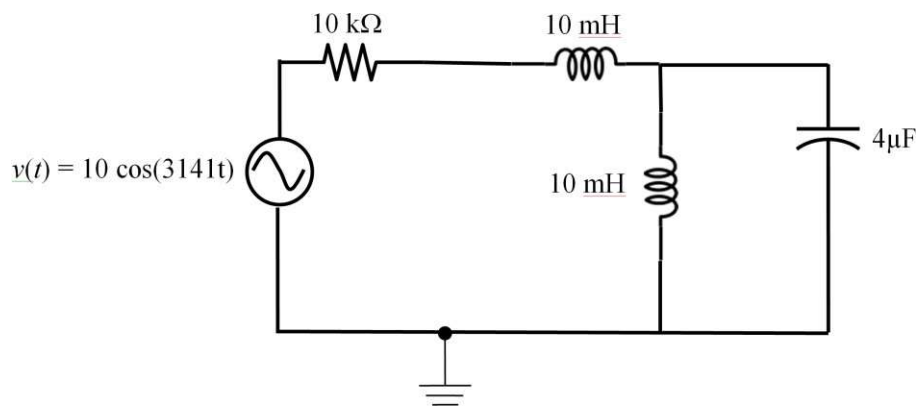


Figure L5.1. A simple RLC circuit with an AC voltage source.

Simulate the above circuit using SPICE. Show the following graphs

- Current vs. voltage across each circuit element.
- Voltage across the capacitor, the inductors and the power supply vs. time.

Using the above graphs, calculate the phase difference between the voltages of different elements. Compare these phase differences with the phase differences obtained from phasor analysis.

Lab

Build the circuit in shown Fig. L5.2.

- Display the voltage across the power supply and the capacitors on the scope, as shown in Fig. L.5.2. Sketch the voltages in your lab report.
- Assuming the source voltage as the reference, what are the phase angles for the three voltages?
- Solve this circuit using the actual values for the components and compare the results with the values obtained in the lab.

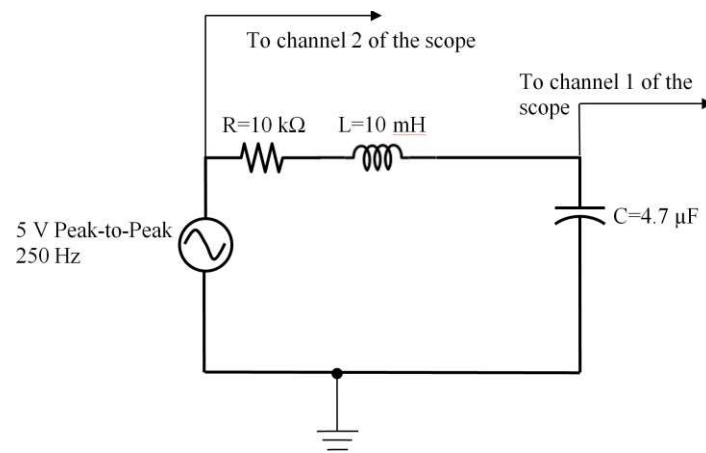


Figure L5.2. A simple RLC circuit with an AC voltage source and the connection to the scope.