

13378 ELECTRICAL CIRCUIT THEORY**Practical No. 2****AC CIRCUIT PHASOR ANALYSIS****Aim**

The aim of this experiment is to investigate the steady state response of an AC circuit and become proficient in calculating and measuring voltage and current phasors and drawing phasor diagrams.

Equipment

NetLab including:

2 Resistance boxes (both set to $100\ \Omega$)

Capacitor box (set to 200nF)

Inductor 10mH

Agilent Oscilloscope with 4 channels

Agilent Function Generator

Preparation

- For the circuit shown in Figure 1 calculate magnitudes and phases of all currents and voltages. Take the source voltage as the reference (with zero phase angle).
- Use Multisim or OrCAD to simulate the circuit and check your calculation results.

Experiment

- Wire the circuit shown in Figure 1. Connect the three oscilloscope channels (Ch1, Ch2 and Ch3) as shown in Figure 1.
- Select the sinusoidal waveform. Adjust the frequency of the input voltage to 5kHz . Adjust the magnitude of the input voltage to 2Vpp (2V peak to peak with 0V DC offset).
- Use the oscilloscope to measure magnitudes and phase angles of all voltages in the circuit (take the source voltage as the reference with 0° phase angle).
- Save data for all oscilloscope channels for processing in MATLAB.
- Delete your circuit from the Circuit Builder and press configure button to disconnect the circuit and reduce the electricity consumption.

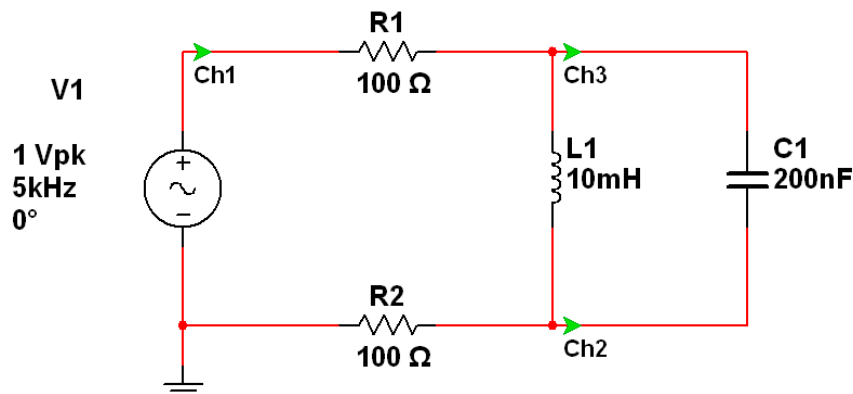


Figure 1

Report

- Using the measured values draw a phasor diagram showing all currents and voltages. You will need to calculate currents from the measured voltages as oscilloscopes only measure voltages (they have high input impedance and cannot be used as ammeters).
- All measured voltages are with a reference to the ground, so you may need to use MATLAB to determine the capacitor and inductor voltages. Document well all your processing and methods used.
- Compare the measured values with the calculated and simulated values. Use a table for comparative display of results.
- Comment on any discrepancies.
- (Advanced!) Determine the resistance of the inductor? Explain and document the method(s) used.