.East West University
Department of Computer Science and Engineering

Course: CSE109 Electrical Circuits and CSE209 Electrical Circuits
Expt No.: 5
Title: Verification of Superposition Theorem

Objective:
1. To verify the superposition theorem theoretically, experimentally, and using PSpice simulation.

Theory:
Superposition theorem works for linear circuits. The superposition theorem states that if a linear circuit contains more than one source, the voltage across or the current through any element may be determined by algebraically adding the contribution of each source acting alone with other sources remaining inactive. A voltage source is made inactive by setting its voltage value to zero (or by replacing it with a short circuit).

Circuit Diagrams:

$$E_1 = 10\text{V} \ E_2 = 5\text{V} \ E_3 = 5\text{V}$$

$$R_1 = 33\Omega \ R_2 = 47\Omega \ R_3 = 33\Omega \ R_4 = 47\Omega \ R_5 = 47\Omega \ R_L = 68\Omega$$
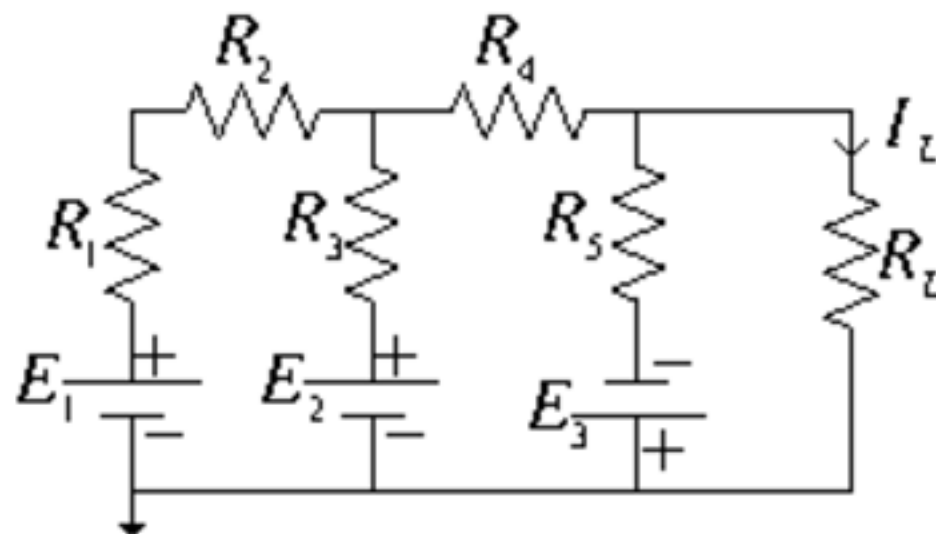

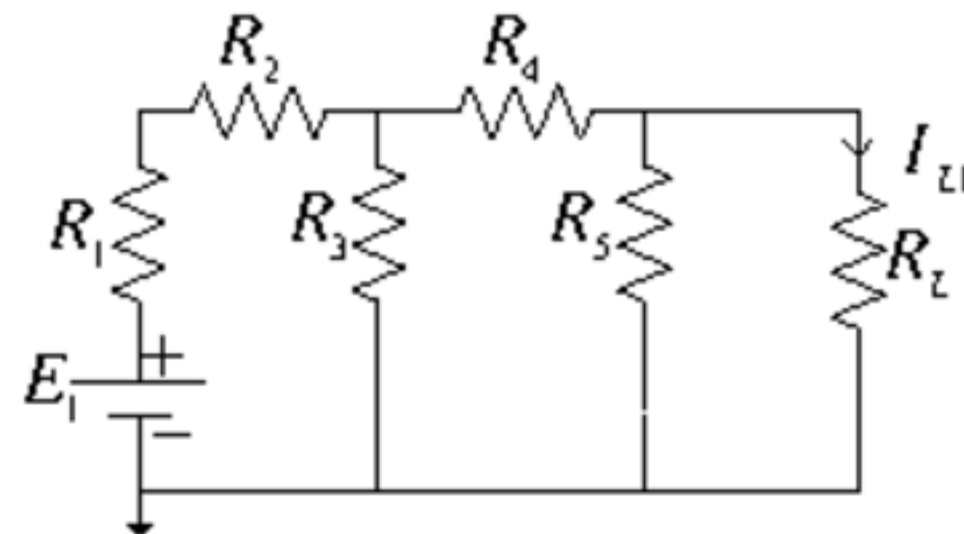
Figure 1. Circuit with all sources active.
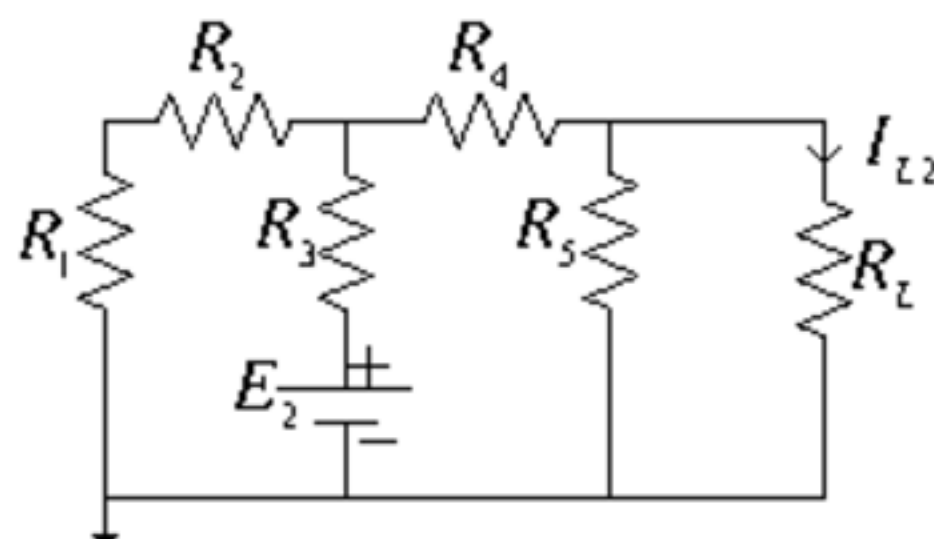

Figure 2. Circuit with E_1 source active.
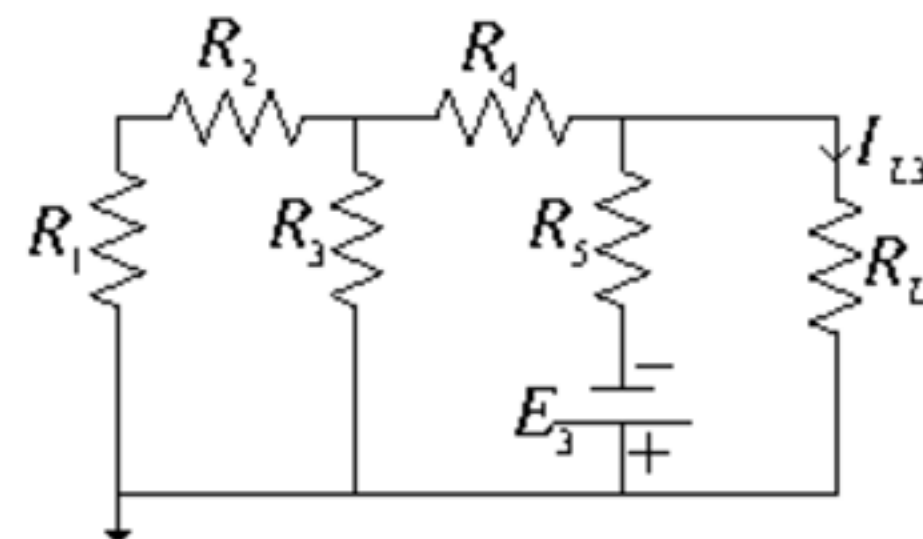

Figure 3. Circuit with E_2 source active.

Figure 4. Circuit with E_3 sources active.

Pre-Lab Report Question:
1. Theoretically calculate the values of I_L, I_{L1}, I_{L2}, and I_{L3} of the circuits of Figures 1 through 4. From the calculated values, show that the superposition theorem holds, that is, $I_L = I_{L1} + I_{L2} + I_{L2}$.