

Electrical and Electronics Engineering Lab Report

Exp No: 04

Exp Name: *Verification of super position theorem.*

Equipments: 1.Ammeter 2.Voltmeter 3.Bread board 4.Three resistance 5.DC power supply 6.Connecting wires

Theory: The superposition theorem states that a circuit with multiple voltage and current sources is equal to the sum of simplified circuits using just one of the sources.

Circuit diagram of superposition: The circuit diagram looks like the following figure below.

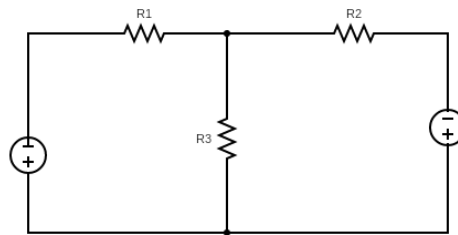


Fig 3.1: Superposition Circuit diagram

Calculation:

Simplifying the circuit for V_1 :

$$\begin{aligned} V_1 &= 3 \\ R &= R_1 + (R_2 || R_3) = 14.479 \, \Omega \\ I_1 &= \frac{V_1}{R} = 0.20A \\ V_1 &= 4 \\ R &= R_1 + (R_2 || R_3) = 14.479 \, \Omega \\ I_1 &= \frac{V_1}{R} = 0.279A \end{aligned}$$

Simplifying the circuit for V_2 :

$$\begin{aligned}
 V_2 &= 5 \\
 R &= R_2 + (R_1 || R_3) = 14.9 \, \Omega \\
 I_2 &= \frac{V_1}{R} = 0.33A \\
 V_2 &= 6 \\
 R &= R_2 + (R_1 || R_3) = 14.9 \, \Omega \\
 I_2 &= \frac{V_1}{R} = 0.40A
 \end{aligned}$$

Data table:

$s.n$	V_1	V_2	I_1	I_2	$I_1 + I_{2m}$	$I_1 + I_{2cal}$	$Error = \left \frac{(I_1 + I_1)_m - (I_1 + I_2)_{cal}}{(I_1 + I_2)_m} \right \times 100\%$
1	3	5	0.19	0.33	0.52	0.53	1.92%
2	4	6	0.26	0.40	0.66	0.67	1.5%

Result: The experimental results indicates that according to superposition theorem multiple voltage and current sources is equal to the sum of simplified circuits using one source. There are some problems in electronics elements of the experiment and these the cause of error.

Discussion: Superposition law is very esesntial law for electrical circuit for solving complex circuit diagram. From this experiment we have verified the law if there work accuracy was better. Though there are a little error, we've verified this law though there are a little error.