

Experiment 4

Parallel circuits

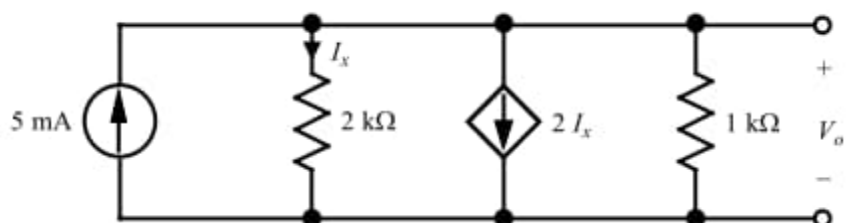
Name	Group	Grade
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Objectives:

1. To measure voltages and currents of parallel circuits and compare them with calculated results.
2. To verify the notion of current division in parallel circuits.

Pre-Lab

Find V_o in the circuit shown.



Solution:

The experiment

1. You are given four resistors. Measure the resistance of each resistor. The smallest resistor is labeled R_1 , the next resistor is R_2 and the largest is R_4 .
2. Using the circuit of Figure 1 with $E = 8$ volts, determine the theoretical voltages at points A, B, and C with respect to ground. Record these values in Table 1. Construct the circuit. Set the multimeter to read DC voltage and apply it to the circuit from point A to ground. Record this voltage in Table 1. Repeat the measurements at points B and C.
3. Apply Ohm's law to determine the expected currents through R_1 and R_2 . Record these values in the Theory column of Table 2. Also determine and record the total current.
4. Set the multimeter to measure DC current. Remember, current is measured at a single point and requires the meter to be inserted in-line. To measure the total supplied current place the multimeter between points A and B. Record this value in Table 2. Repeat this process for the currents through R_1 and R_2 . Determine the percent deviation (as below) between theoretical and measured for each of the currents and record these in the final column of Table 2.

$$Deviation = \frac{|I_{calculated} - I_{measured}|}{I_{calculated}} \times 100$$

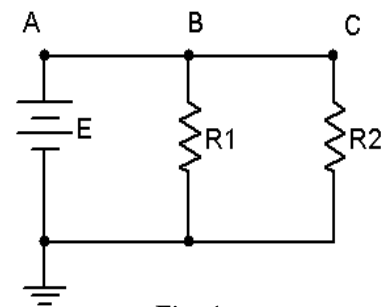


Fig. 1

Table 1

Voltage	Theory	Measured
V_A		
V_B		
V_C		

Table 2

Current	Theory	Measured	Deviation
R1			
R2			
Total			

Calculations:

- Consider the circuit of Figure 2 with $E = 10$ volts. Using the Ohm's law, determine the currents through each of the four resistors and record the values in Table 3 under the Theory column. Also determine and record the total supplied current.
- Construct the circuit of Figure 2. Set the multimeter to measure DC current. Place the multimeter probes in series with R_1 and measure its current. Record this value in Table 3. Also determine the deviation. Repeat this process for the remaining three resistors. Also measure the total current supplied by the source by inserting the ammeter between points A and B.

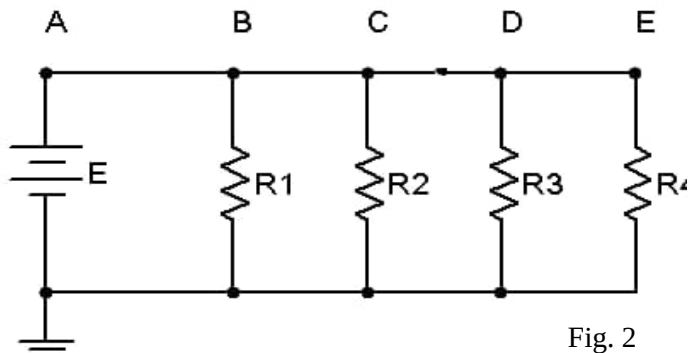


Table 3

Current	Theory	Measured	Deviation
R1			
R2			
R3			
R4			
Total			

** Using the measured voltages, is KCL satisfied in Tables 2 and 3?

Conclusion

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