

Lab 4: Network Analysis and Wheatstone Bridge

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Submitted
At



10/17/22

Laboratory Part 1

Table 2: Resistance Values

	R_1	R_2	R_3	R_4	R_5	R_6	
Nominal Values	1.2	0.51	0.09	0.15	0.1	15	k Ω
Measured Values	1.192	0.505	0.0899	0.149	0.0979	14.998	k Ω

Table 3: Voltages and Currents

	Theoretical	Measured	Percent Error (%)
V_1	0.038 V	0.0379 V	0.26
V_2	0.006 V	0.00617 V	2.83
I_{R4}	0.254 mA	0.268 mA	5.51
I_{R5}	0.062 mA	0.0622 mA	0.322

4. If there are any discrepancies, explain them.

As demonstrated in Table 3, we have very small discrepancies between our measured and theoretical values.

Laboratory Part 2

Table 4: Resistance Values

Resistor	Nominal Values (k Ω)	Measured with Ohmmeter (k Ω)
R_1	1.2	1.191
R_2	0.51	0.504

Table 5: Unknown Resistance Values

Resistor	Measured with Ohmmeter (k Ω)	Measured with Wheatstone Bridge (k Ω)	Percent Error (%)
R_a	9.882	9.775	1.08
R_b	2.951	2.975	0.81
R_c	2.198	2.210	0.55
R_d	10.053	10.101	0.48

R_e	2.692	2.702	0.37
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4. Compare the measured values of resistors by the Ohmmeter and the Wheatstone bridge. Explain if they are different.

As demonstrated in Table 5, our measured values for the resistors by the Ohmmeter and the Wheatstone Bridge have very little discrepancy.

Laboratory Part 3

- A. **As temperature increases for the thermistor, the resistance required to 0 out our wheatstone bridge circuit is decreasing. (20000kΩ: at room temperature| 150000kΩ: applying heat to thermistor)**
- B. **As we block out the amount of light exposed to the photoresistor, the resistance required to 0 out our wheatstone bridge circuit substantially increases. (5300kΩ: at rest| 20300kΩ: blocking out light)**