

# Lab 4: Resistor Networks

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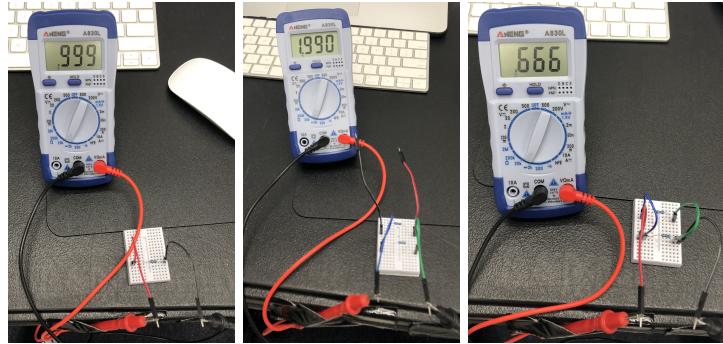
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## Part 1

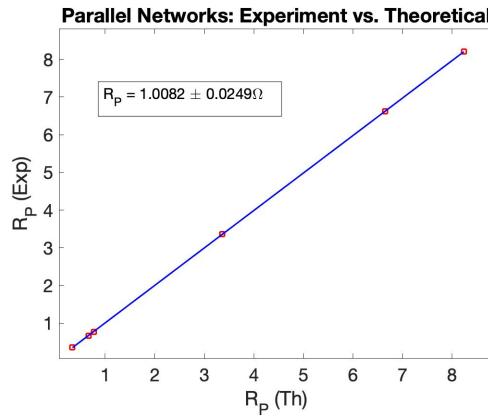
**Table 1: Parallel Networks**

$R_{1,\text{th}}(\Omega)$	$R_{1,\text{exp}}(\Omega)$	$R_{2,\text{th}}(\Omega)$	$R_{2,\text{exp}}(\Omega)$	$R_{P,\text{th}}(\Omega)$	$R_{P,\text{exp}}(\Omega)$
1k	0.99k	2k	1.99k	0.67k	0.67k
1k	0.99k	510	0.51k	0.34k	0.36k
1k	0.99k	3.3k	3.29k	0.77k	0.77k
10k	9.97k	5.1k	5.07k	3.36k	3.36k
10k	9.97k	20k	19.94k	6.65k	6.62k
10k	9.97k	47k	47.40k	8.24k	8.20k

**Picture 1:**  $R_{1,\text{exp}}(\Omega)$ ,  $R_{2,\text{exp}}(\Omega)$ ,  $R_{P,\text{exp}}(\Omega)$



**Graph 1**



## Discussion 1

1. Discuss how well the experimental values of the parallel networks followed the theoretically expected value and quantify that relation.

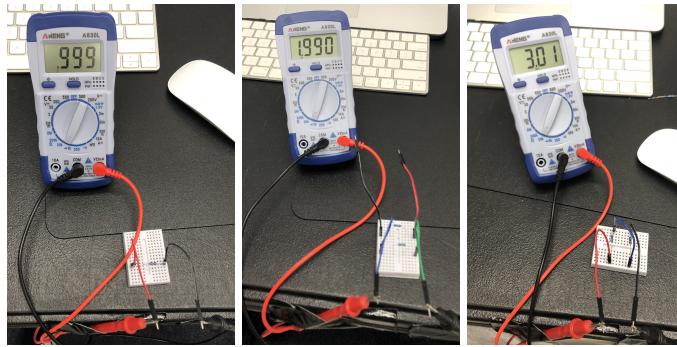
- The experimental and theoretical values are relatively the same with less than 5% difference proving that the voltages are same with currents  $i_1$  and  $i_2$  flowing through the split.

## Part 2

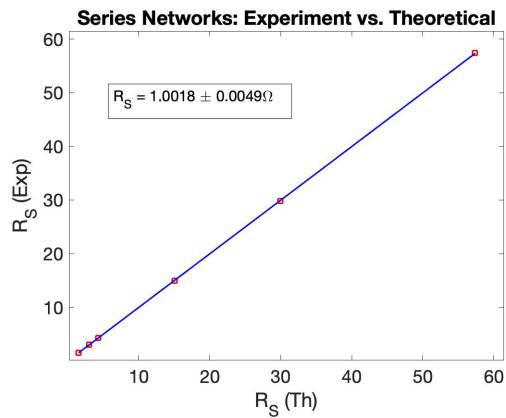
**Table 2: Series Networks**

$R_{1,\text{th}}(\Omega)$	$R_{1,\text{exp}}(\Omega)$	$R_{2,\text{th}}(\Omega)$	$R_{2,\text{exp}}(\Omega)$	$R_{S,\text{th}}(\Omega)$	$R_{S,\text{exp}}(\Omega)$
1k	0.99k	2k	1.99k	2.99k	3.01k
1k	0.99k	510	0.51k	1.51k	1.52k
1k	0.99k	3.3k	3.29k	4.29k	4.31k
10k	9.97k	5.1k	5.07k	15.04k	14.98k
10k	9.97k	20k	19.94k	29.91k	29.80k
10k	9.97k	47k	47.40k	57.37k	57.40k

**Picture 2:**  $R_{1,\text{exp}}(\Omega)$ ,  $R_{2,\text{exp}}(\Omega)$ ,  $R_{S,\text{exp}}(\Omega)$



**Graph 2**



## Discussion 2

1. Discuss how well the experimental values of the series networks followed the theoretically expected value and quantify that relation.

- The experimental and theoretical values are relatively the same with less than 5% difference proving that all charges that flow through  $R_1$  must also flow through  $R_2$ , so currents  $i_1$  and  $i_2$  flowing through both is the same.