ELEN 50 Lab 3: Wheatstone Bridge
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Friday 2:15-5:00p

Using an unknown resistor

$R_k = 356\ \Omega$
$R_x = R_k\ (R_2 / R_1) = 2.66\ k\Omega \sim 2.7\ k\Omega$
R_x measured = $2.68\ k\Omega \sim 2.7\ k\Omega$

Up to two significant digits, they are equivalent.

Using a 2.7 kΩ resistor

$R_k = 358\ \Omega$
$R_x = R_k\ (R_2 / R_1) = 2.69\ k\Omega \sim 2.7\ k\Omega$
R_x measured = $2.70\ k\Omega = 2.7\ k\Omega$

The known 2.7 kΩ resistor is also equivalent up to two significant digits, but this one is more accurate than the first unknown resistor.

We continued using the known 2.7 kΩ resistor from Step 6 for the rest of the lab.

The R_k for the second 2.7 kΩ resistor was only 2 Ohms greater than the first. However, to two significant digits, the two resistors were equal. For more than two significant digits the two values calculated and measured are both within the 5% tolerance denoted on the resistors.

We recorded with the second 2.7 kΩ resistor, the following:

I_a = .6 mA
I_b = 3.24 mA
I = 3.85 mA

With these values we calculated the following powers:

P_v = .0385 W Delivered
P_{R1} = .00072 W Absorbed
P_{R2} = .0054 W Absorbed
P_{Rk} = .003758 W Absorbed
P_{Rx} = .0283 W Absorbed

Delivered = .0385 W ~ .04 W
Absorbed = .038218 W ~ .04 W
Difference between delivered and absorbed = .000282 W but to two significant digits the two values (delivered power and absorbed power) are equal.