Prelab #4: Temperature Coefficient of Resistance
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Objective: The objective of the lab is to measure the temperature coefficient of thermistors and copper wire

Theory: Most metals exhibit a relationship between temperature and resistance. The equation to find the temperature coefficient of resistance is $\alpha=\frac{R_t-R_o}{tR_o}$ where Rt is the resistance of the metal at some t, and Ro is the resistance of the metal at 0C. The equation can also be written as $R_t=\alpha R_o T+R_o$. We can see that this is a linear equation of the form y=mx+b.

Thermistors do not have a linear equation for temperature v resistance, but an exponential one instead. The resistance is given by the equation $R=\alpha e^{(\frac{1}{t}-\frac{1}{t_a})\beta}$.

A Wheatstone Bridge is a setup of resistors to test resistance accurately. When the current measured on the galvanometer is 0 and we know 3 of the resistances, we can calculate the third using the equation $\frac{R_2}{R_3}=\frac{R_1}{R_4}$ where R1-R4 are the 4 resistors in clockwise order starting in the top left.

Procedure: Fill the vessel with water to an inch of the top and mount the thermometer through the hole in the cover of the unit to be tested. Tighten the clamps to secure. Attach the cords to the prongs. Connect the temp sensor. Connect the binding posts. Measure the resistance of the connecting wires. Measure the resistance of the setup to a tenth of an Ohm while below room temp using ice. Increase the temperature of the water by about 5C and remeasure. Repeat until a temperature of 70C is reached.