Lab 1: Battery Evaluation

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0.1 Statement of Purpose

In ECE 205 lecture, we deal with ideal voltage and current sources, but in real life, there are no such things. In this lab, we will use a battery, which is a device which converts chemical energy into electrical energy. Even though we typically think of batteries as ideal voltage sources, we will characterize ways in which the battery differs from the ideal voltage source.

0.2 Procedure

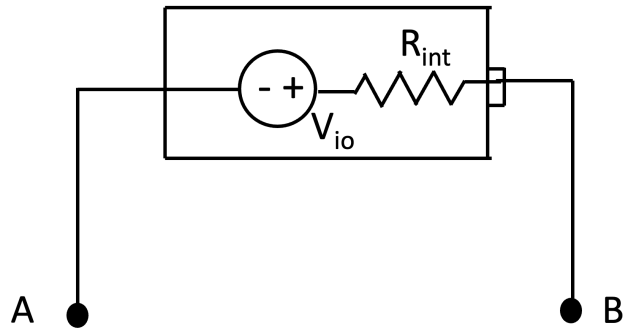

Figure 1: A schematic showing how V_{oc} was measured.

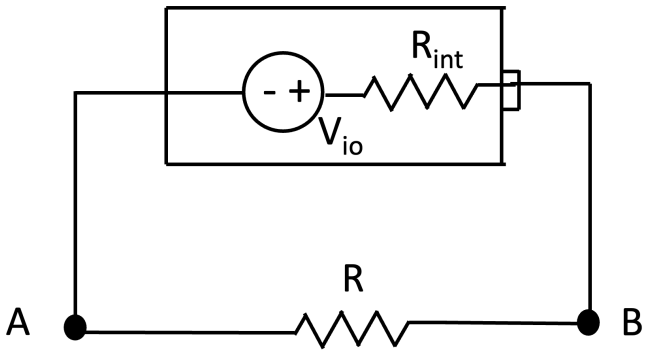

Figure 2: A schematic showing how V_{ab} was measured.

Table 1: Experimental values of V_{oc} and V_{ab} for all three batteries. The current and R_{int} columns are calculated using Eq. **??**

Battery	$V_{oc}[V]$	$V_{ab}[V]$	$I[A]$	$R_{int}[\Omega]$
A	1.6044	1.5918	0.015918	0.79155
B	1.6072	1.6025	0.016025	0.2933
C	1.6083	1.5865	0.015865	1.3741

0.3 Raw Data

0.4 Analysis

The voltage meausered across the battery is the open load voltage, V_{oc},because there is no load or current flowing. V_{ab} is the voltage drop across the 100 Ω resistor. V_{ab} can be used to find the current flowing through the circuit according to Ohm's Law Eq. **??**. The current in addition to V_{oc} can be used to calculate the internal resistance according to the following equation:

$$V_{oc} = I(R + R_{int}) \tag{1}$$

where R is the resistance of the added resistor. For this lab $R = 100\Omega$.

$$R_{int} = \frac{V_{oc}}{I} - R \tag{2}$$

The calculated R_{int} values are tabulated in Table 1.

0.5 Conclusion