Professional Graph

Part of the mission of the 3700 class is to learn to make a professional graph. Here is a few important points:

- Need x and y axis labels. Use one word to describe what you are plotting. Words such as “Number”, “Result”, “Outcome”, and “Value” are not useful since all results can be described as number, result, outcome, and value (penalty: 1 pt).
- Labels must include unit if appropriate (penalty: 1 pt). Voltage does not need unit.
- No grid is needed.
- Do not connect data points with lines unless instructed (penalty: 1 pt).
- The font (including the numbers) must look ~12 points when PRINTED on paper (penalty: 1 pt).
- Whenever possible, plot the raw counts rather than the probability so that the reader can judge if the fluctuations in the data are consistent with the the statistics of the raw counts (penalty: vary).
- Starting with Lab 2 (P3700 only), each data point must have a error bar (make sure it is visible) unless the lab instruction sheet explicitly states that it is not needed (penalty: vary).
- Insert the plot right after the paragraph that it is first referred. Appending the plot at the end of the lab report is not acceptable (penalty: 2 pts/plot).

Please review these rules before submitting a lab report.

Example 3700 Lab Report

Given that 3700 experiments are relatively simple, there is no need for a lengthy lab report. The following is an example lab report for an experiment on 10-sided dice:

This is an experiment that measures the probability for obtaining certain face value for a 10-sided dice with various numbers of rolls. The result is shown in Fig. 1 for the 100 rolls by hand and 1,000, 10,000, and 100,000 rolls via simulations. It is evident that as the sample size increases, the measured probability becomes closer to the theoretical probability of 10% as expected.

Don’t quote any measurement to more than three significant digits (details in lecture 1, penalty: 1pt)

Example 4700 Lab 1 Report

1. The purpose of this lab is to verify the Ohm's Law: the voltage (V) across a resistor R is proportional to the current (I):

$$V = IR$$

Two resistors are used, 99.7 and 2012 Ω. The current in each resistor is measured as a function of the voltage. Figures 1 and 2 show the voltage vs. current for the two resistors, respectively. The data are fitted to a straight line:

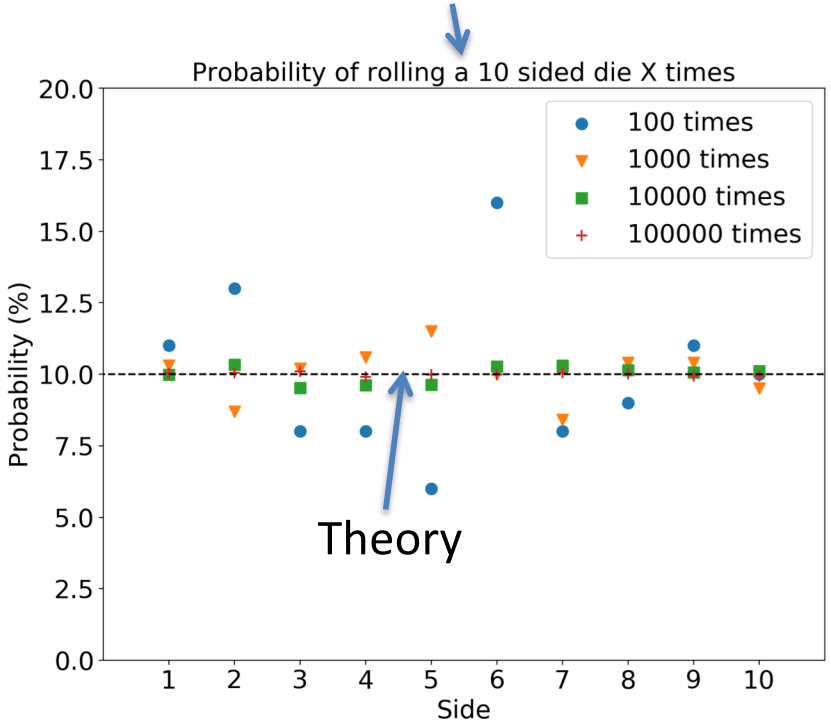
$$V = V_{offset} + IR.$$

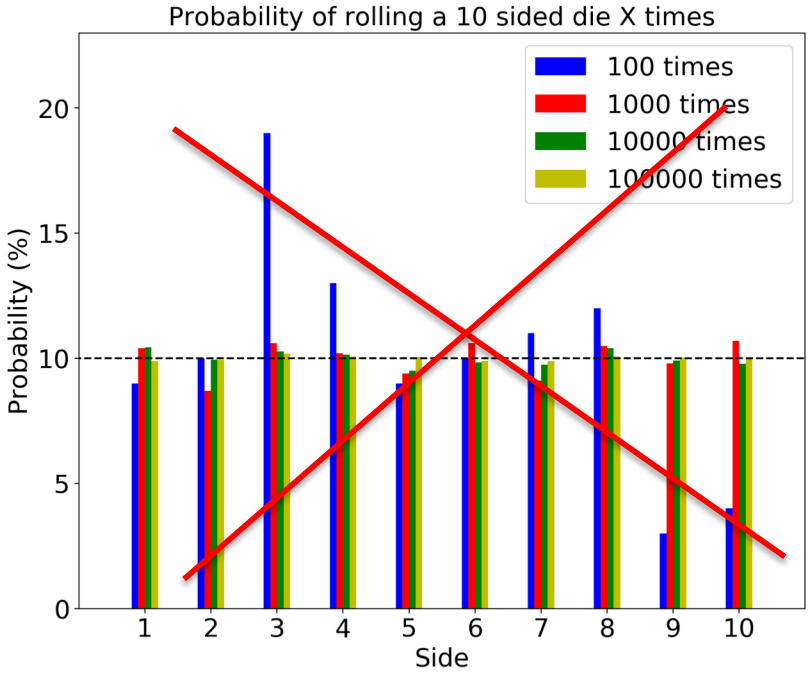
The measured slopes are 96.7 and 1998 Ω, which are consistent with the expected values. The voltage offsets are 0.02 and 0.05 voltages respectively, which are consistent with the expectation of zero for an ideal multimeter. In conclusion, both data are well described by a straight line as expected for Ohm's Law.

Don't quote any measurement to more than three significant digits.

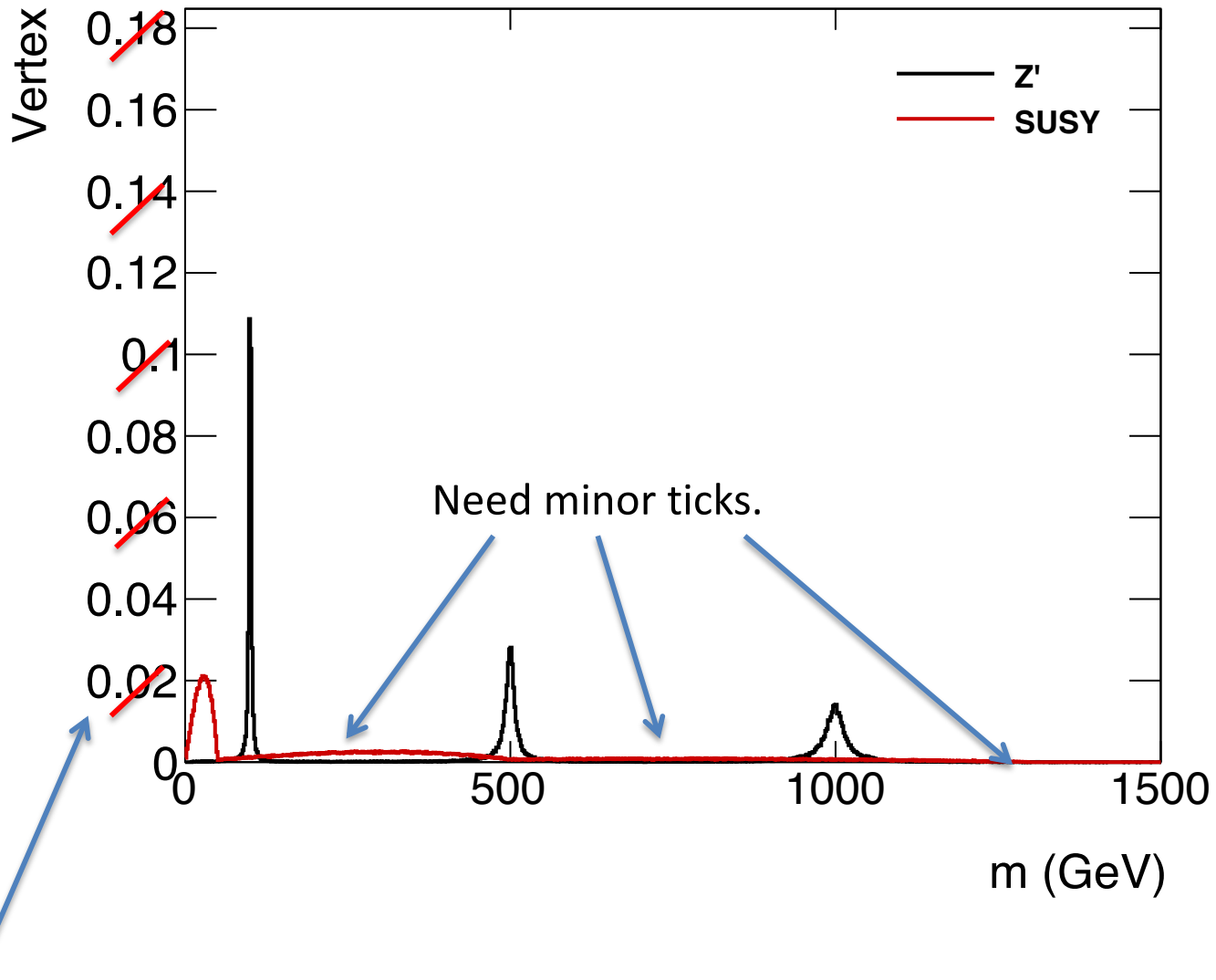
Scatter vs. Bargraph Plots

Graph title is not needed





- As stated above, bar graph is seldom used in scientific publications and hence not accepted unless authorized (minimum noncompliant penalty: 5 pts).
- For the scatter plot, it is easy to see visually that the blue dots for 100 rolls have large scatter around the expectation but the red crosses for 100,000 rolls coalescent closely around the expectation.


Vertex
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
500
1000
1500
m (GeV)
Z'
SUSY
Need minor ticks.
Too many scale labels. Can eliminate some.