

# Lab Report #1 an unofficial and incomplete guide to doing labs with L<sup>A</sup>T<sub>E</sub>X

by

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## 1 Background

This is a template for writing lab reports for Physics 336L. If you already know how to use L<sup>A</sup>T<sub>E</sub>X, this will rock.

If you do not know how to use L<sup>A</sup>T<sub>E</sub>X, this provides general advice, but the learning curve is your problem. I use L<sup>A</sup>T<sub>E</sub>X under Linux, and it is fairly straightforward. L<sup>A</sup>T<sub>E</sub>X requires you to use a text editor *Not a word-processor*. I recommend learning *vim* which comes with a tutor called *vimtutor* and only takes about an hour to begin to get used to. You can also use *gvim* which is vim with a GUI. Both *vim* and *gvim* are open source, free of charge, and run on Apple, Linux and Windows (and android for WIW). So if you want an editor that will last you your lifetime, pick *gvim*. Of course there are lots of other choices.

### 1.1 If you are using Windows

You can absolutely use L<sup>A</sup>T<sub>E</sub>X. My recollection is that the package for Windows is actually called TeTeX.

<http://www.latexbuch.de/install-latex-windows-7/#x1-20001>

The above site claims to specialize in a Windows installation ... I agree with much of what he says, and I HAVE installed and run LaTeX under Windows, but not recently.

In considering the question of an editor, I really recommend against Word. The main reason is it doesn't have syntax highlighting. That will make it much harder to work in LaTeX.

The above link suggests another editor I have never heard of, but sounds like it is designed to make LaTeX easier, so that's a good thing (and it's permanently free).

## 1.2 Assuming you already have L<sup>A</sup>T<sub>E</sub>X installed

The command you want is probably `pdflatex`. The command `latex` by itself will run a version that requires that all figures be in the form of `eps` files. Since it is easier to work with more common file types `pdflatex` is generally preferred. `pdflatex` supports the following file types.

1. jpeg
2. png

### 1.2.1 How to include figures

An example of how to include a figure is below.

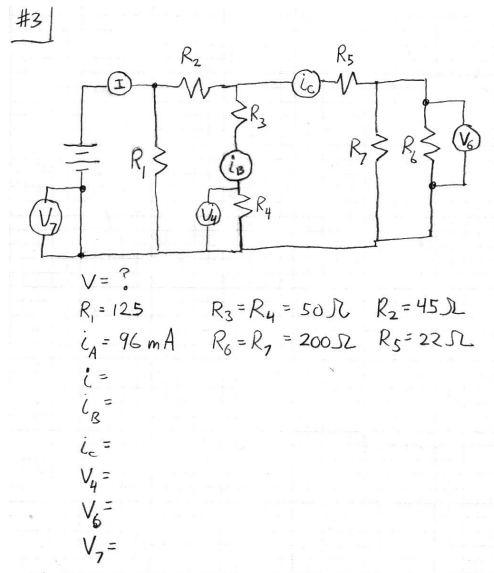


Figure 1: The numbers at the ends of the bars are percentages of faculty selecting that choice. In general, a larger fraction of faculty are from Andromeda galaxy in 2013 than in 2011.

V	$\delta V$	$\frac{\partial R_i}{\partial V}$	$\frac{\partial R_i}{\partial V} \delta V$	R	$\delta R$	$\frac{\partial R_i}{\partial R}$	$\frac{\partial R_i}{\partial R} \delta R$	$V_B$	$\delta V_B \dots$	$\delta R_i$

Table 1: Table listing each value of resistance and each voltage, the uncertainties in each, and the partial derivatives of the internal impedance with respect to the resistances measured. These are the quantities required by the general error analysis formula of Taylor. NOTE: In order to find the partial derivatives, you need to derive an explicit expression for  $R_i$  in terms of  $R$ ,  $V_B$  and  $V$ . This derivation should be in your lab report, as should the expressions for partial derivatives themselves.

## 2 Math

L<sup>A</sup>T<sub>E</sub>X excels at equations. Below are some examples.<sup>1</sup>

### 2.1 Voltage Divider

The voltage divider equation is:

$$\frac{V_{out}}{V_{in}} = \frac{R_2}{R_1 + R_2} \quad (1)$$

$$\int_0^{\infty} \sin(\omega t + \phi) dt \quad (2)$$

Also of concern, Graph 5 is invisible and not included in this report.

### 2.2 Including math inline

You can include math inline thusly. For example what if I wanted to include an  $\alpha$  in my sentence? I just did. I am so excited I could eat a large piece of  $\pi$ . Actually I am not that hungry so I will just eat  $\frac{\pi}{4}$  and then I will go to the bank and  $B\sin(\omega t + \phi)$  some papers.

### 2.3 Tables

Tables are kind of a pain in the neck ... but here is one

## 3 Conclusion

In summary, L<sup>A</sup>T<sub>E</sub>X completely rocks as a means of preparing technical documents, though it has a learning curve.

<sup>1</sup>Stand-up comics need good shoes.