meaning of your data and results. Identifying the graph by a number makes it easy to find, especially if you put all your graphs at the end of your report. Unless you enjoy formatting figures on your word processor (I don't) you should put all your graphs at the end of your report (one graph per page). Then the reader knows exactly where to look for them, which is better than having figures located at the nearest convenient empty space several pages away. The graphs should be numbered sequentially in the order they are referred to in the report. (Be sure to include non-graph figures such as the apparatus diagram in this sequential numbering.)

The details of your analysis from here depend on exactly what question you are trying to answer with your data. Often in your theory section you have worked out an expected relationship between the variables that you have measured. If the expected relationship is linear, then you can check the data you have graphed to see if it is consistent with the expected straight line. More often, the relationship is somewhat complicated and you should include a "best fit" curve to compare with your data. For example, in the first lab you might show a plot of image versus object distance along with the theoretical curve appropriate for a specific "best fit" focal length.

Experimental Uncertainty

An essential part of any analysis is a discussion of your experimental uncertainty. Careful treatment of experimental uncertainty is essential if you are to draw meaningful conclusions from your data. If you have to estimate the uncertainty of any measured quantities, describe how you did your estimate, unless you already did this in the procedure section. Make sure that you state explicitly whether the uncertainty you are quoting is the uncertainly of a single observation or the uncertainty of the mean. Report uncertainties in the same form and to the same precision as your results, and give units: e.g., $2.95 \pm 0.07 \times 10^8$ m/s, not $2.95 \times 10^8 \pm 6.7 \times 10^6$ m/s. I prefer the notation $2.95(7) \times 10^8$ m/s where the parentheses imply the uncertainty in the last significant figure.

This is a good place to point out that "uncertainty analysis" or "error analysis" does not mean, "explain what went wrong and how you'd do it differently next time." Certainly, if in analyzing you data you realize that you carried out some part of the procedure in a way that gave poorer results than you had expected, and you don't have the time to re-do that part of the experiment, you should say so. Thinking carefully about your procedure after you've done the experiment is an important part of improving your experimental technique, and can be critical for eliminating systematic errors from your results. The term "error analysis," however, refers to the quantitative estimation of the experimental uncertainty in your numerical results.