EECS 3440

Electronics Lab

Experiment #99

Modeling a Sample Lab Report

by

[your name]

with lab partners

[their names]

[date experiment performed]
Objective (Required)

This is a one-paragraph statement of what was done in the lab experiment. Normally, only a few sentences are needed. The introduction is not a step-by-step account of the procedure; it is rather a summary of the key idea or analytical process which was tested or demonstrated by the lab experiment.

(Example objective for Exp. 2) The gain, slew rate and high-frequency cutoff of a `741 inverting amplifier were observed experimentally and compared with those found in Exp. 1 using Pspice and a simple model. A non-inverting amplifier circuit and an integrator circuit were also tested experimentally.

Procedure (Required)

This section is also normally brief. It is an overview of what was done, and could be as little as a paragraph of several sentences. The procedure section does not need to be a step-by-step account of the measurement steps, but rather statements of the goals of each series of measurement steps. For example, don’t say “Turn on power, set function generator to 1 kHz, adjust scope, . . .,” but do say “Measure midband gain and high-frequency cutoff.”

(Example procedure for Exp. 2) The midband gain, high-frequency cutoff, and slew rate of Fig. 1, an inverting amplifier, were measured. The slewing behavior of Fig. 1 was studied with square wave signals of various amplitudes. Fig. 2, a noninverting amplifier, was then connected and its midband gain was measured. Fig. 3 is an integrator. It was connected and its behavior was demonstrated using a square wave input. These results were then compared with the Pspice simulation in Exp. 1.

Theory and Discussion (Required)

This is by far the most important section of your lab report. The idea here is to state any relevant theory which is being tested or demonstrated by the experiment, and to discuss the degree to which the experimental results confirmed the theoretical predictions. Remember that most calculations are approximate and are based on simplified models, and that lab components typically have a +/- 5 to 10% value tolerance. Experimental results within +/- 20% of the theoretical are usually adequate. Attempt to address the reasons for any experimental discrepancies exceeding this amount. If you believe the problem is malfunctioning lab equipment, do not put that in this report, rather report it to the lab instructor during the lab and have the department technician check it out! Many of the lab experiments include approximate values of their expected results so that you can get a reality check during lab - if you are getting a big discrepancy, investigate the reason for this.

It is imperative that the questions asked in the lab experimental procedure are answered in this discussion. If your calculations are simple, show a sample here. If your calculations are repetitive or very complicated, put them into an appendix. If a few items of data are measured, state them here, but if there is a large amount of data, put it in an appendix and just refer to it
For a series of repetitive calculations, it is best to show one or two sample calculations, and then list all the other results in a table. Again, be sure that your discussion addresses all of the questions asked in the lab experimental procedure. These questions are typically “leading” questions, so it is good to elaborate on them in your discussion.

Conclusions (Required)

This section is one or two paragraphs summarizing what was done and learned in the lab experiment. This section differs from the objective in that it supplies an interpretation of what the results mean, whereas the objective emphasizes the procedure or tests that were done.

(Example conclusions for Exp. 2) Experiments 1 and 2 show that a simple model behaves similarly to an actual ‘741 op-amp. The amplifier circuits studied had the same gains predicted by the ideal op-amp equations, but also had distinct high-frequency cutoffs and limited slew rates, which are not predicted by the ideal op-amp equations. The integrator circuit produced a nearly perfect triangle wave output with a square wave input. It had the same waveshape and amplitude (to within x%) that were predicted by the transfer function given for an ideal integrator. You could go on to comment on the simple model of the op-amp being a transconductance stage followed by a transimpedance stage, and that the slew rate limitation seemed to be caused by the fact that the transconductance stage was limited in the amount of output current it could deliver.

References (as needed)

A reference section is not normally needed; however, if you are directly quoting information or conclusions from other sources, such as an electronics book or an internet source, you should provide the reference.

Appendices (as needed)

If you have extensive lists of raw data taken in the experiment, put it in an appendix. If you have a complicated calculations, you should use judgment regarding whether to put it in the main body of the discussion, or to show its details in an appendix and just quote the result in the discussion.