

GUIDELINES FOR TERM PROJECTS AND PAPERS

These guidelines were compiled to help you research and prepare your term paper.

1 Technical Content

There must be a substantial technical component of the scope, depth and detail that one might find in exam questions. Mathematical arguments should be arguments, not just lists of equations gleaned from other peoples' work. Don't repeat a simple experiment dozens of times with minor variations. Don't pad the report with computer-generated lists of numbers. Do present your data with a few graphs; it's much more compact and meaningful. I can not stress enough the importance of a clear presentation of your study. Readers are more inclined to trust a clean, well-presented derivation than a messy one.

2 References

Don't just quote the text. References should be traceable, preferably to reputable journals such as *IEEE Transactions on Automatic Control*, *Automatica*, *International Journal of Control*, etc.. Private conversations with your cousin do not qualify, nor do discussions with God. References should be cited in the text and listed in a references section. If you can't find an appropriate place to cite a reference in the body of the text, don't include it in the references; it's probably not relevant.

3 Appropriateness of Topic

The topic should relate directly to the class and to problems and subjects touched on in the class. Do not turn in a report loosely copied from some on-the-job activity unless it incorporates a good deal of class-related material and meets the other guidelines. Don't write a report on material that belongs in another class; if this is a Nonlinear Control class, don't do a study on computer compilers, unless the emphasis is clearly on Nonlinear control.

4 Strength of Arguments

Arguments should be supported by one of more of the following: technical references, experiment, and mathematical development. You will be rewarded for rigor in your arguments and for original thought. You will be penalized for weak conclusions, not supported by experimental data or by correct theoretical arguments. I want to caution you that a hypothesis is just that until proven theoretically correct or discredited by at least one counterexample. **YOU CAN NOT CONVINC ME OF THE CORRECTNESS OF YOUR ARGUMENTS USING A FEW EXAMPLES.** You should however, illustrate your results using examples.

5 Conclusions

An investigation must have a purpose besides the obvious one of satisfying a course requirement. An investigation should result in a conclusion; that is, you should have gained some insight about how things work together. We don't need a scientific breakthrough (although one would be nice), just show that you have put information to use in some sensible way to draw a useful conclusion. If this is an original development, state results obtained by others then make your own contributions clear. If yours is an expository report summarizing a field that is already developed, you should have formed some opinions about the relative merits of one approach over another. State them. Your conclusions must be your own, not a restatement of something that is common knowledge. Also, it is OK to disagree with published results as long as your disagreement is backed up with logical arguments.

6 Writing Style

s is not a writing class. Nevertheless, the ability to express your thoughts clearly to professors, employers, customers and sponsors can do wonders for your career. Try to give your writing flow and focus. The ideas and data should follow a logical flow of thought that carries the reader smoothly to your conclusions. Focus the discussion on the one or two major points you have to make. Again, I stress that the clarity of your presentation will go a long way in proving the correctness of your results. Save interesting but irrelevant material for another paper (or another class). Use correct grammar and style. Consult a good style guide such as *Elements of Style* by Strunk and White.

7 Components of the Report

The technical report should have the following organization:

7.1 Title

meaningful, not too long; should accurately reflect, at a glance, the content of the report. A general title like "Nonlinear Control" is not appropriate for a paper about using Variable structure controllers for robots. Instead say something like "A Variable Structure Controller of a Rigid Robot."

7.2 Abstract

about 100 words, outlining the motivation, method and conclusions. This should give the reader enough information to decide whether he or she wants to read the whole paper.

7.3 Introduction

Background material necessary to understand the paper.

7.4 Main arguments

Should be concise, not repetitive; should lead to and support conclusions.

7.5 Conclusion

Every paper needs one. You wrote the paper to make a point; your opinion is important. You can summarize the main points here to give emphasis to your argument.

7.6 References

Go for quality, not quantity. Only list references you have cited in the paper.

7.7 Appendix

useful supporting information, such as lengthy derivations, are moved to the appendix to avoid cluttering the main argument with detail.

8 Length of the Paper

The length of the paper does not include separate pages for figures, appendices, references. Ten or twelve pages, maximum, should be allocated to the main body of the paper. If you don't need that much space, that's fine. Once again, quality is more important than quantity.