LaTeX Lab Report Skeleton

Group 00
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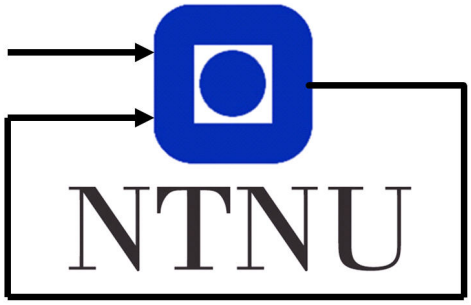
January 1, 1970



Department of Engineering Cybernetics

Contents

Copied from the lab assignment text:

A lab report describing what has been done in this project work should be handed in after the project work is completed. For each part of the exercise the report should include:

- Printouts of data from relevant experiments (plots).
- Relevant model derivations, calculations and parameter values (remember to include units and scaling).
- Discussion and analysis of the results.
- Simulink diagrams and MATLAB code.

All group members are graded based on the report. When the report is evaluated:

- documented calculations,
- experimental results,
- analysis and discussion of the results,
- skills in MATLAB/Simulink,
- and the quality of the written documentation of the results will be emphasized.

The report counts for 26 % of the final grade in this course.

You should delete this page. It should not be part of your final PDF!

In the following pages, we have written a skeleton that you should fill in. The italic text is only for extra guidance and should be deleted.
There should not be a need to add any other (sub)sections.

Unless you have a very good reason not to, you should write the report in English. If you want a larger example on how to use LaTeX, have a look at the template that was used in TTK4115 and previously in this course as well: `https://github.com/ntnu-itk/labreport`.

1 10.2 - Optimal Control of Pitch/Travel without Feedback

1.1 The continuous model

Answer 10.2.1.1

1.2 The discretized model

Answer 10.2.1.2. Remember to document the calculations.

1.3 The open loop optimization problem

How is it formulated?

1.4 The weights of the optimization problem

Try using the values 0.1, 1 and 10 as weights q. Plot the manipulated variable and the output. Comment the results with respect to the different weights chosen.

1.5 The objective function

Furthermore, discuss the objective function (15) (in the lab assignment text) in particular the term $(\lambda_i - \lambda_f)^2$*. For instance, could any unwanted effects arise from steering the helicopter to* $\lambda = \lambda_f$ *with this objective function?*

1.6 Experimental results

Printouts of data from relevant experiments (plots). Discussion and analysis of the results. Answer 10.2.2.7 here.

1.7 MATLAB and Simulink

Code and diagrams go here

2 10.3 - Optimal Control of Pitch/Travel with Feedback (LQ)

2.1 LQ controller

Briefly explain LQ controller. Especially, but not limited to, what is the role of the matrices Q and R? Justify your choice of weights.

2.2 Model Predictive Control

Answer 10.3.1.3 here.

2.3 Experimental results

Printouts of data from relevant experiments (plots). Discussion and analysis of the results. Answer 10.3.2.5 here.

2.4 MATLAB and Simulink

Code and diagrams go here

3 10.4 - Optimal Control of Pitch/Travel and Elevation with Feedback

3.1 The continuous model

Answer 10.4.1.1

3.2 The discretized model

Answer 10.4.1.2

3.3 Experimental results

Printouts of data from relevant experiments (plots). Discussion and analysis of the results. Answer 10.4.2.6 here.

3.4 Decoupled model

Answer 10.4.2.7

3.5 MATLAB and Simulink

Code and diagrams go here

3.6 Optional exercise

Which constraints did you add? What was the results? Plots? Discussion?

References