

DEVELOPMENT AND FEASIBILITY OF OPEN-SOURCE HARDWARE
AND SOFTWARE IN CONTROL THEORY APPLICATION

by

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B.S., Kansas State University, 2014

A THESIS

submitted in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE

Department of Mechanical and Nuclear Engineering
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KANSAS STATE UNIVERSITY
Manhattan, Kansas

2017

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2017

Abstract

Control theory is a methodology investigated by many mechanical and electrical engineering students throughout most universities in the world. Because of control theory's broad and interdisciplinary nature, it necessitates further study by application through laboratory practice. Typically the hardware used to connect the theoretical aspects of controls to the practical can be expensive, big, and time consuming to the students and instructors teaching on the equipment. This is due to the fact that connecting various hardware components such as sensors, encoders, amplifiers, and motors can lead to data that does not fit perfectly the theoretical mold developed in the controls classroom, further dissuading students of the idea that there exists a connection between developed theoretical models and what is seen in practice.

There is a recent trend in universities wishing to develop open-source, inexpensive hardware for various applications. This thesis will investigate and conduct a multitude of experiments on an apparatus known as the Motorlab to determine the feasibility of such equipment in the field of control theory application. The results will be compared against time-tested hardware to demonstrate the practicality of open-source, inexpensive hardware.

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Acknowledgments

Enter the text for your Acknowledgements page in the `acknowledge.tex` file. The Acknowledgements page is optional. If you wish to remove it, see the comments in the `etdrtemplate.tex` file.

Chapter 1

Introduction

In this chapter there are examples of various features you may want to incorporate into your document. Here's an example of a figure inserted into the text:

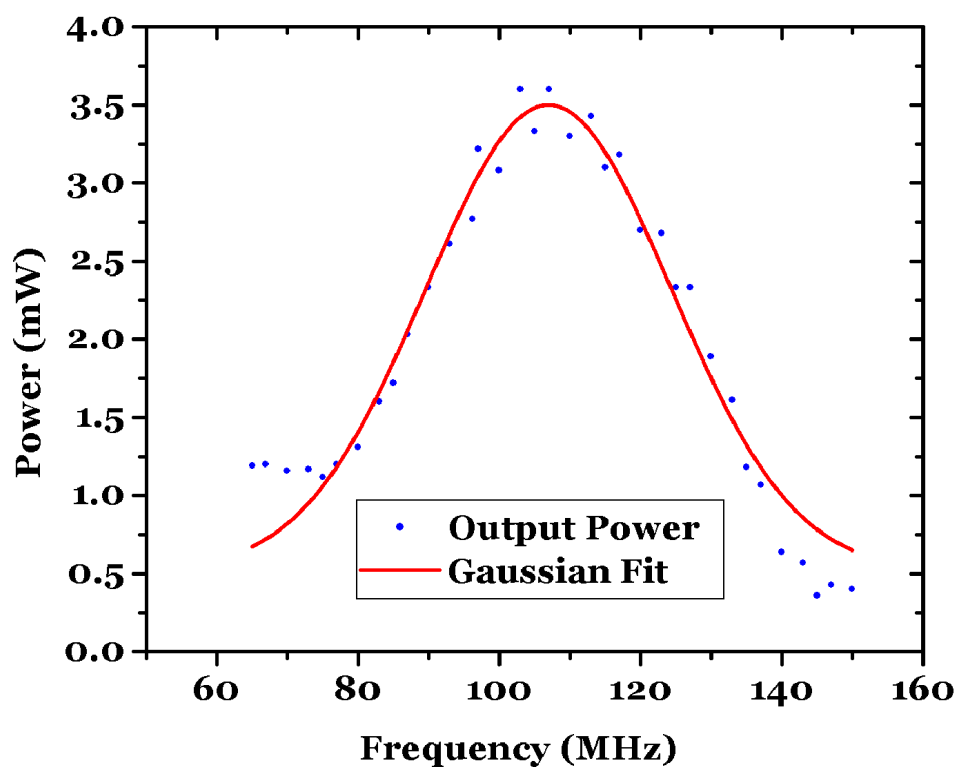


Figure 1.1: *Full caption to appear below the Figure*

See the file chapter1.tex for examples of the commands used to insert a figure or table, add a caption, etc. Here is an example of a table:

Table 1.1: *Caption to appear above the table*

Column 1 Heading	Column 2 Heading	Column 3 Heading
Col 1 Row 1	Col 2 Row 1	Col 3 Row 1
Col 1 Row 2	Col 2 Row 2	Col 3 Row 2
Col 1 Row 3	Col 2 Row 3	Col 3 Row 3

1.1 Making References to Figures or Tables

It is possible to create cross-references and hyperlinks to items or sections within your paper. For example, here is a reference to Fig. 1.1 mentioned at the beginning of this chapter and a reference to the Table 1.1.

1.2 Making a Reference to a Chapter Subsection

In this section, we refer back to text mentioned in Section 1.1 on page 2.

1.3 Making a Citation

Here's an example of a citation to a single work.[?] It's also possible to make multiple citations.[?]?

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Chapter 2

This is Chapter 2

To refer to Chapter 1, use the slash ref command along with the "makereference" label which was assigned back at the beginning of Chapter 1.

2.1 Page Number References

It is possible to refer to a specific page number, such as page 1. Add a slash label command and a unique name for each page to be referenced later in the text.

2.2 Referring to Sections Within Chapter 1

It is possible to refer to sections within a chapter. Add a slash label command and a unique name with the section number for each section to be referenced later in the text. Here is an example of a figure in section 1.1 and an example of a table in section 1.2. In section 1.3, we looked at examples of bibliographic citations.

Chapter 3

This is Chapter 3

Here are more examples of references to previous sections. In Chapter [1](#) there were several sections, including section [1.1](#), section [1.2](#), and section [1.3](#).

Likewise, in Chapter [2](#), there are sections [2.1](#) and [2.2](#).

Appendix A

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Appendix B

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