On the development of a very important stuff

by

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Thesis

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Statement of Originality

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

John Doe
30th December 2014

Acknowledgments

Here you say "thank you" to your supervisor, your colleagues, faculty, fellow students, mom and dad...

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The University of Newcastle
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Contents

Abstract

Very briefly summarise your work and what the thesis is all about.

Publications and Outcomes

The material presented in this Thesis has been already published, or accepted for publication, in peer-reviewed journals and conferences. Some of the material has been recently submitted for publication. The list of publications is provided below.

Articles in peer-reviewed journals

A and B, XXXXXXXXXX . *Journal on YYYYYYYYYY*

Conference proceedings

A and B, XXXXXXXXXX . *Journal on YYYYYYYYYY*

Chapter 1

Overview

What the heck this thesis is about?! Give a very condensed summary.

1.1 Review of previous works

Unless you are an outright genius, your work must have been based on a work of your predecessors - cite them! Like this [1]. Or, if there are many other works, like this [2–4].

1.2 Contributions of this Thesis

Say what you have done (if anything) with your thesis - what is the actual contribution (problems posed and solved) with this thesis?

1.3 Thesis Overview

Provide a short overview of the contents of each chapter, chapter-by-chapter. Obviously, it is written when everything else is done.

Chapter 2

Introduction

2.1 Some good ideas about writing your thesis in LaTeX

It goes without arguing that the Ph.D. thesis in hard science *must* be written in LaTeX, and not in that dumbed-down pointy-clicky behemoth MS Word/OpenOffice for office plankton.

The fact is: Word/Openoffice is useful for small, insignificant, unstructured and unimportant documents. LaTeX, on the other hand, is a powerful programming language for technical people and their complex, well-structured, math-ridden and picture-rich documents.

The following tips and tricks can (and will!) save you countless sleepless nights and oceans of tears:

- separate each chapter of your thesis in its own file, and then use `\input{myfile}` command to link then in a master document *thesisPhD.tex*
- put pictures in a separate subdirectory/subfolder, preferable splitting them chapter-wise;
- pick up either dvips or pdflatex, and don't mix them! The difference:
  - use **dvips** if you have a lot of vector figures (from Gnuplot, for example) and vector graphics (in EPS format). You can always convert them to PDF using a command: `epstopdf foo.ps`
  - use **pdflatex** in all other cases (if you don't need to convert your work to rtf/doc, or you don't know what EPS is).
- use **bibtex** or **natbib** for all your citations, it will save you countless buckets of tears
- use the `\label` command in LaTeX wisely:
  - give names to different items with appropriate prefixes, e.g., `\label{eq:maxwell}` is a better reference to the Maxwell equations than `\label{123}`
  - use a colon (:) for references in chapters and sections, like `\label{chap:intro:sec:review}`

- use version control system (Subversion/Mercurial/Git/whatever - they are FREE!) with LaTeX to:
  - be able to roll back any change or recover a section/chapter/paragraph at your advisor's second thought (aka "you know, a month ago we had a section here that it looked really nice...")
  - to backup your whole thesis (especially true with distributed version control systems like Mercurial or Git) and sync your work between home/uni;
  - to upload the code into a private repository on the Web (yet another backup).
- use bug/issues tracking capabilities in GitHub.com or bitbucket.com to flag the areas to discuss / improve.

... and the rest of ideas from your thesis advisor.

2.2 Mathematics

Any *good* thesis contains at least some mathematical expressions.

In optimization we want to minimize or maximize an objective function over a set of decision variables subject to constraints. There are different ways to format optimization problems, but the preferable way is to follow an excellent book "Convex Optimization" by Stephen Boyd and Lieven Vandenberghe. A general optimization problem has the form:

$$\begin{aligned} \underset{x}{\text{minimize}} \quad & f_0(x) \\ \text{subject to} \quad & f_i(x) \leq b_i,\ i = 1, \ldots, m. \end{aligned}$$

If we want to perform quadratic programming, the notation will be the following:

$$\begin{aligned} \underset{x}{\text{minimize}} \quad & J(x) = \frac{1}{2}\mathbf{x}^T Q\mathbf{x} + c^T\mathbf{x} \\ \text{subject to} \quad & A\mathbf{x} \leq \mathbf{b} \text{ (inequality constraint)} \\ & E\mathbf{x} = \mathbf{d} \text{ (equality constraint)} \end{aligned} \tag{2.1}$$

Eq.2.1 is a rather sophisticated LaTeXformulae. Unlike the tabular environment, in which you can specify the alignment of each column, in the aligned environment, each column (separated by `&`) has a default alignment, which alternates between right and left-aligned. Therefore, all the odd columns are right-aligned and all the even columns are left-aligned.

2.3 Tables

An example of a simple table is provided below in Table 2.1. You may use `booktabs` package for more advanced/beautiful tables.

See Table 2.1.

23121	1212	232
cat	frog	dog

Table 2.1: An example of a table

2.4 Pictures

An example picture is in Fig. 2.1. You may also use floating figures with wrap-around (use the `wrapfig` package, although they often create a lot of troubles.

Figure 2.1: An example picture.

Also you may consider a `subfig` package if you want to put figures side-by-side and reference them separately (like Fig. 3a or Fig.3b).

Chapter 3

Conclusions and Future work

Appendix A

This appendix should get a letter

An appendix before the backmatter gets an automatically generated letter by which it can be referred to. This is Appendix A.

Appendix B

Simulation Source Code

You may want to investigate the `lgrind` program and package if you wish to include source code in your thesis

Last Thing

This sort of appendix has no letter.

Bibliography

[1] T Mita. On zeros and responses of linear regulators and linear observers. *Automatic Control, IEEE Transactions on*, 22(3):423–428, 1977.

[2] Karl Johan Åström and Bjorn Wittenmark. *Computer-controlled systems: theory and design*. Courier Dover Publications, 2011.

[3] AM Annaswamy, S Evesque, S-I Niculescu, and AP Dowling. Adaptive control of a class of time-delay systems in the presence of saturation. In *Adaptive Control of Nonsmooth Dynamic Systems*, pages 289–310. Springer, 2001.

[4] John C Doyle and Guter Stein. Robustness with observers. *IEEE Transactions on Automatic Control*, 24(4):607–611, 1979.