

AN ABSTRACT OF A THESIS

TYPESETTING TTU MASTER AND DOCTORAL THESIS WITH L^AT_EX

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This is a short guide to using a style file `ttuthesis.sty` and a set of templates posted at

<http://math.tntech.edu/TTUthesis/thesis.html>

when typesetting in L^AT_EX a master or a doctoral thesis according to current requirements of TTU Graduate School. We will review the requirements and then concentrate on an efficient use of the templates. In particular, we will discuss do's and don't's as far as creating, one by one, L^AT_EX input files with subsequent parts of a sample thesis. Emphasis will be placed on an efficient use of L^AT_EX automatic numbering and formatting features as well as on including and manipulating graphics files, tables, and figures. At the end, we will address simple troubleshooting of formatting "errors" and how to fix them. This "thesis" is intended as a sample thesis to help all TTU graduate students – in engineering, humanities, mathematics, and sciences – who would like to use L^AT_EX in typesetting their theses.

TYPESETTING TTU MASTER AND DOCTORAL THESIS
WITH L^AT_EX

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by
Rafal Ablamowicz

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CERTIFICATE OF APPROVAL OF THESIS

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WITH L^AT_EX

by

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Graduate Advisory Committee:

Andrew Hetzel, Chairperson date

Brian O'Connor date

Claude McHenry date

David Smith date

Approved for the Faculty:

Francis Otuonye
Associate Vice-President for
Research and Graduate Studies

Date

DEDICATION

This thesis is dedicated to my wife Halina whose encouragement has meant so much to me during the pursuit of my graduate degree and when writing this thesis.

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I would like to thank all Dr. Ralph Nimoy, Dr. Mike Spock, and Professor RTD2 for their most valuable help in writing this thesis. Hope they will help me write another thesis later...

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CHAPTER 1

INTRODUCTION

In this work we describe, step-by-step, all technical aspects of typesetting a master thesis or a dissertation in \LaTeX while meeting all formatting requirements of TTU Graduate School. Formatting is accomplished automatically with a style file `ttuthesis.sty`. Reference [1] is an excellent guide to \LaTeX a copy of this book is available in the Math Office in Bruner 235. Another short guide to \LaTeX intended for graduate students is posted as a pdf file [2] while all necessary files, including the most up-to-date style file `ttuthesis.sty`, needed for typesetting are posted at [3].

All current requirements of TTU Graduate School regarding electronic theses and dissertations are posted on the Graduate School web page [4]. In particular, one finds there:

- (i) *A Guide to the Preparation of Theses and Dissertations* [5],
- (ii) A very helpful checklist for performing a final check whether a thesis or a dissertation has been prepared according to the requirements of TTU Graduate School [6]
- (iii) A set of slides from a workshop on how to prepare a thesis or a dissertation. [7]

The requirements of TTU Graduate School can be roughly divided into two groups: (a) formatting aspects, like fonts, margins, spacing, labeling, etc., and (b) language aspect, that is, how to actually write the text, references, etc.

In this work we only address the formatting aspects of theses and dissertations, while for all other requirements we refer to the Graduate School web page. [4]

In order to simplify typesetting of an entire thesis (or dissertation), each part of the thesis is written as a separate file with an extension `.tex`. These files are:

1. `thesis.tex` – this is the “top file” which reads in the style file `ttuthesis.sty` and all subsequent files listed below in correct order. This is the only file which needs to be typeset,
2. `ttuthesis.sty` – this file must not be changed in any way. It is programmed to meet all formatting requirements of the Graduate School,
3. `abstract.tex` – this file contains an abstract of the thesis and is required,
4. `dedication.tex` – this file contains a dedication page and is optional,
5. `preface.tex` – this file contains a page of acknowledgments and is optional,
6. `chapter1.tex`, `chapter2.tex`, ... – these files contain subsequent chapters,
7. `references.tex` – this file contains all references or a bibliography, and is required,
8. `vita.tex` – this file contains a vita of the author and is required,
9. `appendixA.tex`, `appendixB.tex`, ... – these files contain subsequent appendices and are optional.

We begin by describing the “top” file `thesis.tex` – called a “skeleton file” – which formats a thesis and reads all needed files in proper order. In this file, there are a few logical switches which provide great flexibility to formatting the thesis. Their logical values may be changed by the author or their default values will be used instead. Each switch is described inside the file and instructions can be read there how to set them. These instructions then be read when the file is being edited in any \LaTeX editor.

CHAPTER 2

THE SKELETON FILE

The first line in the skeleton file `thesis.tex` is

```
\documentclass[12pt]{report}
```

The only change allowed in this line is to replace `12pt` with either `11pt` or `10pt` since the font size allowed by the Graduate School ranges from `10pt` to `12pt`. The default size is `12pt`. Then, in the next few lines

```
\usepackage{ttuthesis} %reading in TTU thesis/dissertation style file
\usepackage{amssymb}   %to augment generic LaTeX; needed for \mathbb
\usepackage{amsthm}
\usepackage{amsmath}   %needed for \begin{align}... \end{align}t
\usepackage{graphics}
```

one reads in any needed \LaTeX or \mathcal{AMS} packages. Then, come lines

```
\report{Thesis} %default is Thesis, you can put Dissertation here
\title{Typesetting TTU Master and Doctoral Thesis\\ with \LaTeX}
\author{Rafal Ablamowicz} %put your name here
\degree{Master of Science} %change to, for example, Master of Art if
                             %needed
\department{Mathematics} %this is your discipline
\graduatedate{May 2011} %graduation date
\graduateyear{2011} %graduation year
```

which are self-explanatory. Remember to put your title in a required “inverted pyramid style”: This can be accomplished by using line breaks `\\`. If you wish to typeset a dissertation, in `\report{Thesis}` change the word `Thesis` to `Dissertation`.

The next two lines are needed to set up a correct total number of members of the student’s Graduate Advisory Committee. In this sample we have four members without any co-chair so the lines read:

```
\committee=4
\cochair=0
```

One sets a total number of the committee members including the chair and co-chair, if used, on the line `\committee=4` but change 4 to 5 with maximum value of 6 if you need more lines for the Graduate Advisory Committee Members on page (iii). If you do not need a co-chair, set `\cochair=0` but if you do need a co-chair, change this line to `\cochair=1`. When you do, the second line will list a name of co-chair which needs to be put in later as in

```
\def\gradcommitteecochair{Rafal Ablamowicz}
```

Then comes a sequence of logical switches whose values are set to false or true depending on one's need. We describe these switches next.

1. `\tablespagetrue` – a default is `\tablespagetrue` assuming one wants to print a page which lists tables. If no such page is needed, e.g., when there are no tables in the thesis, change it to `\tablespagefalse`.
2. `\symbolpagefalse` – a default is `\symbolpagefalse` which assumes that the author does not want a table of symbols to appear in the thesis. However, sometimes such table helps with notation and is desirable. In such case, replace `\symbolpagefalse` with `\symbolpagetrue` to create such page. However, then you need to make sure you have a file available which explains the meaning of symbols used in your thesis. The name of that file is assumed by default to be `symbol`, that is, `symbol.tex` unless it has been changed by the next line to say `symbols.tex`. If not, and the file `symbol.tex` is not available, an error will appear when typesetting the file. Thus, if you want to have a different file name, un-remark the next line in the skeleton file and specify the name of your file with symbols and their meanings as shown next.

3. `\symbolfile{symbols}` – this inputs a TeX file called `symbols.tex` instead of the default `symbol.tex` when `\symbolpagetrue` is set on the previous line. Remark this line if it is not needed or the file `symbols.tex` is not available otherwise an error will be reported when trying to typeset the thesis.
4. `\permissionpagefalse` – this does not print a permission page, but when changed to `\permissionpagetrue`, the permission page will be printed. Check the current requirements of the Graduate School in this respect. [4, 6]
5. `\dedicationpagetrue` – this prints a dedication page provided a file with dedications `dedication.tex` is available, or a typesetting error will result. When changed to `\dedicationpagefalse`, the dedication page will not be printed.
6. `\acknowledgmentspagetrue` – this prints an acknowledgments page provided a file `preface.tex` is available. If the file is not found, typesetting will stop and the error will be reported. If this page is not needed, change it to `\acknowledgmentspagefalse`.
7. `\copyrightpagetrue` – this prints a copyright page. If this page is not needed, change it to `\copyrightpagefalse`. Check the current requirement in this respect. [4, 6]
8. `\sectionnumberstrue` tells your typesetter to print section and subsection numbers. Change it to `\sectionnumbersfalse` if no section numbers are needed. In such case, chapter numbers are still printed.

Finally, a few lines which help with typesetting difficult places in the table of contents and in the references. These lines define input to certain commands in \LaTeX that have to do with typesetting.

1. `\appendname{APPENDICES}` – if left the way it is shown, the word APPENDICES will be printed on a single page preceding the first appendix. However, if only one appendix is to be included, change this word to APPENDIX. The appendix or the appendices may or may not be included in the thesis. If they are not to be included, this page is not printed.
2. `\tocheader{Chapter}` – default is Chapter: This prints correct header in Table of Contents (TOC) on the second page of TOC, if TOC is long and needs to appear on the second page. When the word “Appendices” or “Appendix” should appear instead in the header, change “Chapter” to “Appendices” or “Appendix” as needed.
3. `\bibname{BIBLIOGRAPHY}` – change it to BIBLIOGRAPHY if the word BIBLIOGRAPHY is preferred to the word REFERENCES on the page preceding the references.

The Advisory Graduate Committee is set up by the next few lines in the skeleton file. Names and functions of all Committee members are printed on page (iii) of the thesis. First, a name of the current Associate Vice-President for Research and Graduate Studies, which appears at the right bottom of page (iii), is set by the command:

```
\def\deansname{Francis Otuonye}
```

Then, a name of the Advisory Committee Chairperson is set in the line

```
\def\gradcommitteechair{Andrew Hetzel}
```

and it will appear always on the first line. The total number of all committee members is set by `committee=4` line above. If there is no committee co-chair, then the value of `\cochair=0` is zero; otherwise, it is set to `\cochair=1`. In this latter case, a name of the committee co-chair needs to be entered via the command:

```
\def\gradcommitteecochair{Rafal Ablamowicz}
```

and this name replaces the name of the second member of the committee unless the value `committee=4` is increased to `committee=5`. It is not practical to have more than six members on the committee as then there is simply not enough space for all these names on page (iii).

The last part of the preamble usually contains various macro definitions written by the author and which help with typesetting. Here is a sample of such definitions:

```
\newcommand{\ed}{\end{document}}
\newcommand{\cl}{C \kern -0.1em \ell}
\newcommand{\rev}[1]{#1 \, \tilde{}}
\newcommand{\uhat}{\hat{u}}
\newcommand{\fhat}{\hat{f}}
\newcommand{\ftilde}{\tilde{f}}
\newcommand{\fbar}{\bar f}
\newcommand{\BK}{\mathbb{K}}
\newcommand{\BF}{\mathbb{F}}
\newcommand{\BC}{\mathbb{C}}
\newcommand{\BR}{\mathbb{R}}
\newcommand{\BH}{\mathbb{H}}
\newcommand{\bff}{\mathbf{f}}
```

To help with hyphenation of difficult words, for example, of the word “quadratic”, we may include a line

```
\hyphenation{quad-rat-ic}
```

Finally, in a mathematics thesis, we usually have theorems, propositions, lemmas, etc., or some specially named theorems. These \LaTeX environments need to be defined as follows:

```
\newtheorem{lemma}{Lemma}
\newtheorem{theorem}{Theorem}
\newtheorem{remark}{Remark}
\newtheorem{corollary}{Corollary}
\newtheorem{example}{Example}
```

```

\newtheorem{proposition}{Proposition}
\newtheorem{definition}{Definition}
\newtheorem*{mainA}{Theorem A}
\newtheorem*{keylemma}{Key Lemma}
\newtheorem*{lemmaA}{Lemma A}

```

Finally, the very last part of the skeleton file reads in all chapters, appendices, if any.

It looks as follows:

```

\begin{document}
\include{abstract}      %reads in abstract.tex
\beforepreface         %creates all pages before the permission page
\permissionpage        %creates the permission page
\dedicationpage        %creates the dedication page
\acknowledgmentspage   %creates the acknowledgments page and prints word
                        %ACKNOWLEDGMENTS must be 1 inch below the top margin;
\afterpreface          %creates pages after the preface but before chapter 1
\ttutext               %sets parameters for the actual text, e.g., spacing
\include{chapter1}     %reads in file chapter1.tex
%\include{chapter2}    %reads in file chapter2.tex
%\include{chapter3}    %reads in file chapter3.tex
\include{references}   %reads in references.tex
\include{appendixA}    %reads in appendixA.tex
\include{appendixB}    %reads in appendixB.tex
\include{vita}         %reads in vita.tex
\end{document}

```

The very last line `\end{document}` indicates the end of the skeleton file.

REFERENCES

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APPENDIX

APPENDIX A: THIS IS MIKE'S FIRST APPENDIX

In addition to the main package CLIFFORD, in Sections ?? and ?? we have used the following additional procedures from a supplementary package AVSD.

- Procedure `phi` provides an isomorphism between a matrix algebra and a Clifford algebra.
- Procedure `radsimplify` simplifies radical expressions in matrices and vectors.
- Procedure `assignL` is needed to write output from a Maple procedure `eigenvects` in a suitable form, it sorts eigenvectors according to the corresponding eigenvalues, and it uses the Gram-Schmidt orthogonalization process, if necessary, to return a complete list of orthogonal eigenvectors.
- Procedure `climpoly` belongs to the main package CLIFFORD. It computes a minimal polynomial of any element of a Clifford algebra.
- Procedure `makediag` makes a “diagonal” Σ matrix consisting of singular values.
- Procedure `embed` embeds the given non-square matrix or a matrix of smaller dimensions into a $2^k \times 2^k$ matrix of smallest k such that it can be mapped into a Clifford algebra.

VITA

Jane Doe was born December 31, 1975, in Cookeville, TN. While attending junior high in Baxter, she participated in the MATHCOUNTS competition and ranked number 1 at the state level. In 1993 she graduated Magna Cum Laude from Baxter High School with 4.00 GPA ranking 5 out of 156. While still in high school, she completed 32 credit hours from Tennessee Technological University: 13 in calculus, 3 in differential equations, 10 in Spanish and French, and 6 in English. She was a member of Kappa Mu Epsilon, a national honorary society for mathematics students. From 1993 she enrolled as mathematics major at Tennessee Technological University. In 1995 she received S.A. Patil Award for the best mathematics junior. In 1996 she graduated Magna Summa Cum Laude from Tennessee Tech with B.S. in mathematics and minor in computer science.