DISSERTATION TITLE

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Author

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The abstract is double-spaced and limited to 350 words. As many people will learn about your work through your abstract published in Dissertation Abstracts (http://proquest.umi.com/login), you should spend a good bit of effort in the composition of both the abstract and the title of your work. Try to convey the flavor of your work, not just the bare bones of your findings; in an average abstract there will be about 70 characters per line with a maximum of 35 lines. You should also work to phrase your title so that it truly describes the contents and will be easily found in the index of Dissertation Abstracts. The index is based on key words, so be as specific as you can be about your subject.

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CHAPTER 1

DOCUMENTATION

This pdf doubles as documentation for the iuphd.cls file, and as a sample for the output. The iuphd class is based on the standard LaTeX report class, and as such you may assume that it follows the default formatting of the report class unless otherwise specified below. The changes to the report class include the following:

- changes to the default settings for margins, font size (11pt), spacing (double), and pagination,

- the quote, quotation, and verse environments have been changed to switch temporarily to single spacing, and remove the extra space at the top and bottom,

- the enumerate and itemize environments have been changed to remove extra space between the items and at the top and bottom,

- a line has been added to prevent the double spacing from affecting arrays,

- both numbered and unnumbered chapter headings are now centered by default,

- heading names such as CHAPTER, and BIBLIOGRAPHY are now all caps by default regardless of how they are typed, *(This is accomplished with the help of textcase.sty. Not all latex distributions come with this by default.)*

- changes to the definitions of \maketitle and the 'abstract' environment,

- the addition of commands for creating the acceptance page and copyright page,

- the addition of the 'acknowledgments', 'preface', and 'dedication' environments,

- the addition of macros for specifying the department or school name, the names of the committee members, the defense date, and the copyright year,

- document class options for changing "Department" to "School" on the title page, and for showing the abstract, preface, acknowledgments, or dedication in the table of contents.

The appropriate commands for using these features are already typed into the dissertation.tex sample file, with the optional items (dedication, preface, and copyright) commented out. Simply remove the % from the front of these optional commands if you wish to use them. The headings for the acknowledgments, preface, and dedication have been defined as unnumbered chapter headings, which means they will not show up in the table of contents by default. See the instructions below for adding them to the table of contents if desired.

1.1   CURRENT STANDARDS AT IU

The current version of iuphd.cls complies with the standards of formatting a dissertation at IU as of 2013. Below is a discussion of some of the main points.

The current pagination standard is for the page number to appear centered at the top or bottom of the page, and to use lowercase roman numerals for the material preceding the first chapter with the title page unnumbered but counting as page one. The only part of this that is not standard in the LATEX report class is the use of roman numerals, which was accomplished by changing the definitions to \maketitle and \tableofcontents.

The current standard for chapter headings seems to be that they are centered and in all caps. The iuphd.cls enforces these conventions automatically, however it is possible to override these changes with titlesec and titletoc. Because the textcase package is used, the capitalization is not affected in math mode, so for instance

\section{p-adic numbers}

will give the output "*p*-ADIC NUMBERS" in both the section heading and in the table of contents (unless the value of \tocdepth is changed to prevent sections from being listed in the table of contents). Since all caps takes up more space horizontally than mixed upper and lowercase text, the size of the chapter headings has been reduced to \LARGE from \huge. However, no changes have been made to the size of any of the other headings in the report class.

Most dissertations are one-sided, with an additional half inch added to the left hand margin on each page for the purpose of binding. Although this is the standard, they do allow for the possibility of two-sided printing, which would cause the side with the extra margin to alternate for binding. This is automatically enforced simply by using the twoside option (a feature already built into the standard report class). This is done as follows:

\documentclass[twoside]{iuphd}

There does not seem to be a standard about whether the abstract, preface, acknowledgments, and dedication are listed in the table of contents (TOC) or not. As such, an option has been provided for including or excluding each one individually. The syntax for these options follows the pattern 'showX' if X is to be listed in the TOC, and 'hideX' if X is to be omitted from the TOC, where X can be any of the four items listed above. In all cases, the default is for these *not* to have entries in the table of contents. So for example, to include both the abstract and the preface in the table of contents, but not the dedication or acknowledgments, you would use the code:

\documentclass[showabstract,showpreface]{iuphd}

To include a line for the bibliography in the table of contents, the command

\addcontentsline{toc}{chapter}{BIBLIOGRAPHY}

should be placed directly above the \bibliography and \bibliographystyle commands. It may be necessary to use \clearpage above this command to get the page number displayed in the contents to be correct. However, if you are using \include for each chapter, then \clearpage has technically already been used in this case, and so it is not necessary to use it again. Similar commands will work for including any unnumbered heading in the table of contents, with careful attention to the effects of \clearpage.

Various commands have been defined for the data that will show up on the title page, acceptance page, and copyright page. These include:

- \title - for the title of the dissertation

- \author - for the name of the author of the dissertation

- \date - for the *completion date* of the dissertation

- \department - this is optional. The default value is "Mathematics," but if you are in a different department, this command can be used to change its value to the name of whatever department (or school) you are in.

- \committeechair, \readertwo, \readerthree, \readerfour - for the names of the dissertation committee members.

- \defensedate - for the *defense date* of the dissertation (which may not match the completion date).

- \cryear - for the copyright year.

Additionally the commands \acceptancepage and \copyrightpage have been defined to generate the acceptance page and copyright page respectively. The copyright page is not required, so it has been commented out of my dissertation.tex sample file. Two document class options have been provided for switching the text on the title page between "Department" and "School." These options are given the obvious names 'department' and 'school'. The default option is 'department', so it only needs to be changed if you are in a school rather than a department.

A CV is also required following the bibliography, however, to maintain maximum flexibility I have not provided any special tools for formatting a CV. Various packages are available that do this, although I prefer custom formatting. As such, I have provided only a line for including the CV after the bibliography, which is currently commented out.

1.2   SUGGESTIONS FOR ADDITIONAL FORMATTING

For longer documents, it is often easier to manage if it is broken into multiple files. This can be done by using the \include{filename} or \input{filename} commands. You can think of \input{filename} as an alias for all of the text contained in filename.tex: the text contained in that file, simply gets inserted at the exact spot where the command \input is used. This means that filename.tex should not have \begin{document}, \end{document}, or a preamble, as illustrated by iuphd-doc.tex in this example. On the other hand, \include{filename} has the additional feature of adding \clearpage both before and after the text being inserted. This has important consequences for formatting. Say that you have a file for each chapter, and your first chapter is the introduction. If you do something like this:

\chapter{Introduction}

\include{chap1}

then the title is formatted on its own page, and the text in chap1.tex will start on a new page; it produces the same result as

\chapter{Introduction}

\clearpage

\input{chap1}

To avoid having the title put on a separate page there are two options: use input instead of include (without \clearpage), or use the command \chapter{INTRODUCTION} inside the

file chap1.tex. I favor the second option as illustrated in this example with iuphd-doc.tex.

Many LaTeX packages are already available for additional customization of the formatting which is otherwise built in. Some of these are listed below. To use them, simply declare them with \usepackage in the preamble and refer to the documentation files for them, which are easily available online.

- titlesec - for custom formatting of part, chapter, and section headings.

- titletoc or tocloft - for custom formatting of the table of contents.

- nomencl - for lists of notation (a tweak of makeindex).

- prettyref - for custom formatting of references (e.g. referencing equations as (1), (2), etc., instead of the default 1, 2, etc.). The ams packages also have a similar feature but it is much more limited.

- natbib, custom-bib, or biblatex - offer additional flexibility for bibliography formatting beyond the standard used by the mathematics community.

- setspace - contains features for resetting the global line spacing, as well as environments that can be used to change spacing locally, which are compatible with the quote, quotation, and verse environments.

- quoting - provides a more flexible quotation environment, with options for adjusting the margins manually. This package should be used with setspace, to ensure single spacing of the quotations.

- enumitem or paralist - provide several more flexible list environments.

- titling - for custom changes to maketitle.

- geometry - for customizing the page layout.

The last two should not be necessary unless the standards at IU change. However, if that happens, it would really be better to rewrite the iuphd document class. Additional packages and other useful information can be found in [1].

1.3 QUOTE SAMPLES

The quote environment:

> "God does not play dice with the universe." - Albert Einstein

The quotation environment:

> "A GREAT discovery solves a great problem, but there is a grain of discovery in the solution of any problem. Your problem may be modest, but if it challenges your curiosity and brings into play your inventive faculties, and if you solve it by your own means, you may experience the tension and enjoy the triumph of discovery."
> - George Pólya

The verse environment:

> Im September ist alles aus Gold:
> die Sonne, die durch das Blau hinrollt,
> das Stoppelfeld,
> die Sonnenblume, schläfrig am Zaun,
> das Kreuz auf der Kirche,
> der Apfel im Baum.
> Ob er hält,
> ob er fällt?
> Da wirft ihn geschwind
> der Wind
> in die goldene Welt.
> - Georg Britting

1.4 TROUBLESHOOTING

If you are getting an error with the TOC, you may have at least one of the following two

problems:

1. you do not have textcase.sty in your latex distribution,

2. you compiled a previous *.toc file with a different latex class (e.g. the amsbook class).

Make sure you have textcase.sty, delete the *.toc file, and recompile.

BIBLIOGRAPHY

[1] F. Mittelbach, M. Goossens, J. Braams, and C. Rowley. *The LaTeX companion.* Addison-Wesley series on tools and techniques for computer typesetting. Addison-Wesley, 2004.