

The USFDissertation L^AT_EXClass File

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0 Introduction (Revised)

The University of South Florida (known as “USF” hereinafter) has a set of arcane formatting rules for dissertations. They are a mix of typewriter instructions and half-digested word-processor templating policies with a general conception of what a scholarly document should look like and an anticipation of what microfilming might do to the document. In other words, all manner of technologies and typographical conceptions are rolled together into a mix which is fairly difficult to interpret and certainly impossible to anticipate. In the mathematical sciences the pre-eminent idiom of document preparation is the L^AT_EX system, based upon the T_EX program of Donald E. Knuth. Luckily, this program is eminently adapted to producing whatever idiosyncrasies of print one would like to employ. In some sense, then, the required format is child’s play for L^AT_EX.

However, the ordinary Mathematic & Statistics Department Doctoral Candidates finds herself at somewhat of a disadvantage in this situation. There is for her the double demand of satisfying both L^AT_EX processing rules (for Mathematics & Statistics dissertations must be written in L^AT_EX) and the USF formatting rules. In addition, questions of format are typically and justifiably subordinated to the questions of creating and ordering of the *content* of the dissertation. When the last moment is nigh, time pressure, a minimal L^AT_EX acquaintance, and the imperatives of the format check, etc., conspire to induce the maximum feeling of panic.

At that point, lack of time inhibits a proper T_EXing (making satisfaction of format requirements more difficult) and increases the temptation to structure the document piecemeal (making the use of L^AT_EX superfluous). We get *de jure* rather than *de facto* adherence to the USF formatting standards, and a document that is internally inelegant. Any Candidate sufficiently familiar with L^AT_EX must have felt, up to now, the pressing lack of a true USF Dissertation *formatting template*, although she may indeed use a hollowed version of some earlier Candidate’s compromises as a *document template*. That is, while anyone who had piecemeal solved some of the formatting problems posed by the Dissertation requirements could pass these solution on in a `.tex` file, there was no specific *class* (`.cls`) file upon which to rely. And in discovering this as correcting residual problems, time was ticking away.

In writing my dissertation I began to address this issue by creating the first version of `USFDissertation.cls`. This has been offered, with some success, to successive Doctoral Candidates as the repository of the solution of formatting problems, performed at an appropriately low level¹. Credit for significant alterations to that initial class file goes to Ed Cureg (brave enough to use it on his own), Luis Camara (who helped with the first implementation of bolding in the headings), and Michiru Shibata (who helped add numerous refinements).

¹To give an example of what this means, it is possible with this file to change the name of the abstract. Say you wanted to call it a “praecis”. Then you would include in the preamble of your `.tex` file the command “`\renewcommand{\abstractname}{Praecis}`”. Then, when you run L^AT_EX on your file, not only is the abstract named Praecis, but it occurs all in caps on its page, but in ordinary fashion in the table of contents.

All in all, the Mathematics & Statistics Doctoral Candidate can be fairly confident that it will perform as advertised, although, as with all free software, it is provided with warranty real or implied of any kind.

Finally, it is hoped that by placing it in the public domain, various annoying details that remain may be resolved by future enterprising Candidates. If you are one who introduces such an improvement, be certain to document it in this file.

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1 Basic use of the class file

1.1 Contents of this Document

As with every class file, your dissertation `.tex` file begins with the line invoking it:

```
\documentclass[option list]{USFDissertation}
```

Between this line and the `\begin{document}` command, lies the preamble. It must contain several things, and so these are dealt with in Section 2.

Next, there is a specific order to the parts of a dissertation, outside the body thereof, and a number of specialized environments (you know: the things that begin `\begin{yadayada}` and end with a matching `\end{yadayada}`). These are for producing typical and sometimes *required* portions of the dissertation. These are discussed in Section 3.

Finally, (more or less) there are a number of environments for math entities, namely Theorems and the type, that are available by use of the **thrmmacros** option. In addition, there are peculiarities to the use of other of the options. These are discussed in Section 4.

The actual last word is in regard to processing the file and various pitfalls that may be avoided. This document is hardly the place for dealing with every \LaTeX you may see – buy a good book on the system for that – but a few difficulties related purely to dissertation composition are mentioned. These, and some general advice about composing a dissertation using \LaTeX are to be found in Section 5.

This seems like a good point to mention the program LyX, which provides a nice GUI front end to the \LaTeX system. It can produce other documents as well, and special modifications are required to use the **USFDissertation** class file under LyX. I would be happy to provide what I have, so just contact me at dkephart@mail.usf.edu if you are interested.

1.2 Class Options for USFDissertation

Although this material may be repeated later on, it is customary to list up front the option that may be passed to a class file. That is, these are the things

USFDissertation will act on if they are included in square brackets after the invocation of the class file, like this:

```
\documentclass[option1,option2,...]{USFDissertation}
```

The following options are the default options for USFDissertation: **letterpaper,oneside,openany,titlepage,11pt,outsidechair,final**. Alternatives to these and additional options are discussed in this section.

1.2.1 a4paper/a5paper/b5paper/letterpaper/legalspaper/executivepaper/landscape

It is dubious that any of these paper sizes other than the default, **letterpaper**, is of any use, but, just in case, they have been retained. USF standards basically require you to print on U.S. letter size paper.

1.2.2 10pt/11pt/12pt

You can control the fontsize in which USFDissertation attempts to set your dissertation. The default is the middling 11 point size, which looks pretty good.

1.2.3 draft/finaldraft/final

The **draft** option causes the document to be processed double-spaced, with heavy lines in the margin to mark horizontal overflow (lines that L^AT_EX could not figure out how to break properly).

This **finaldraft** option causes the document to be processed with 1½ line spacing, and with light lines in the margin to indicate horizontal overflow.

This **final** option, which is the default, causes the document to be processed with 1½ line spacing, and without indication of horizontal overflows. This, it should be noted that this is “final” in the sense that this author used this format for the final production of his dissertation.

1.2.4 showlabels

USFDissertation prints the names of labelled text (where the `label` macro is used for cross-referencing. Note that this implies a dependency: the file `showlabels.sty` must be present in your T_EX installation. Labels are not show, by default in either `finaldraft` or `final` mode, so this option allows you to display them, anyhow.

1.2.5 thrmdefs

Activates a set of theorem-like environments (see Section 3), predefined for your convenience. One this you may or may not like: they use small caps for their titles. This option is the default.

1.2.6 ams

Activates all AMS \LaTeX packages. And by all, it is intended that *all* of them are called. This implies another dependency: you must have *all* of AMS \LaTeX in your \TeX installation.

1.2.7 bbm

Activates black board math lettering. Just in case you didn't pick it up by using **ams**. This implies another dependency.

1.2.8 boldheadings/plainheadings

By defaults, with **plainheadings**, the title of the dedication, acknowledgments, table of contents, list of tables, list of figures, references, and bio (About the Author) are in bold. With the **boldheadings** option, the title, author name, and ABSTRACT on the abstract page, the chapters, sections, and subsections, and the labels of the floats (like "Table 1") within the dissertation are also bolded.

1.2.9 rsfs

Activates Ralph Smith Formal Script font. The font may be elicited in text with the $\text{\RS}\{formal script text\}$ command, or in a math context with the $\text{\mRS}\{formal script symbols\}$ command. The dependency involved here is more than slight, since there seems to be a hair-splitting distinction between the CTAN interpretation of "free", i.e., GPL code and the indefinite permissions granted by Ralph Smith, the distributor of the **rsfs.sty** package.

1.2.10 times/arial

The option **times** activates the **time.sty** font package, and this is the default setting for **USFDissertation**. It is a peculiarity of USF formatting that *only* Times and Arial are mentioned as permissible fonts. So forget your Computer Modern, or the much more attractive Charter.

The option **arial** activates the alternative Arial font for your dissertation. If this tempts you, be sure to try reading a page or two of math text written in a sans-serif font like Arial, first!

1.2.11 titlepage/notitlepage

This is a purely \LaTeX option, although the **titlepage** option is pretty much *de rigueur* for a dissertation, and it is the default. You might want to use **notitlepage** from time to time, to save paper. But remember that only the prefatory pages (title, table of contents, abstract) are required for the format check. So you want to get it working pretty early into the game. Contents of the title page are discussed in Section 2 and Section 3.

1.2.12 **oneside/twoside**

This choice is a standard one in L^AT_EX class files. As it turns out, only **oneside** makes sense for dissertations, although **twoside** may come in handy for paper-saving preprints.

1.2.13 **openany/openright**

Again, a standard L^AT_EX choice which only makes sense, however in combination with **twoside**.

1.2.14 **chair/outsidechair**

This choice allows you to elicit or suppress printing of the name of your committee chairperson, which is supplied in the `\chair{...}{...}` macro. The option **outsidechair** is the default. For, while it is strongly customary to select a committee chairperson from outside the Mathematics Department, such a person is not regarded as an ordinary Committee member for publication purposes and his or her name should therefore *not* appear on the title page. This option allows the ultimate in flexibility in this matter.

1.2.15 **leqno/fleqno**

These are different options for the placement of equation labels.

1.2.16 **openbib**

Frankly, I don't have experience with this option. Therefore, I retained it in case others do and like it.

2 The Dissertation Preamble

Of course, you will include manifold abbreviating macros in your preamble. `USFDissertation` also includes a battery of macros intended to help set up the title page of the dissertation, as this is the most prominent page of the document.

For certain things need to be set up before the document begins. Even some things common to L^AT_EX files have special effects for compliance with USF formatting. This section deals with these.

2.1 **author**

Format: `\author{your full name}`
Use: This is you. It is required.
Notes: Don't misspell this. However, it's okay to continue a particularly long name onto two lines, using `\\`.

2.2 degree

Format: `\degree{ degree, spelled out }`
Use: Specifies the degree you are receiving. Required.
Notes: No abbreviations, here. For example, “Doctorate of Philosophy.”

2.3 department

Format: `\department{ name of department }`
Use: Specifies the department awarding your degree. Required.
Notes: For example “Mathematics.” No abbreviation allowed.

2.4 college

Format: `\college{ college name }`
Use: Specifies which college is awarding your degree. Required.
Notes: For example, “Arts and Sciences”

2.5 university

Format: `\university{ University of South Florida }`
Use: Specifies the university awarding your degree.
Notes: If nothing is specified, this defaults to the University of South Florida.

2.6 majorprofessor

Format: `\majorprofessor{ name }{ degree }`
Use: Specifies your advisor. Required.
Notes:

2.7 chair

Format: `\chair{ name }{ degree }`
Use: Specifies the chairperson of your committee.
Notes: *Do not use this if this person is not a regular committee member also!*

2.8 committeemember

Format: `\committeemember{ name }{ degree }`
Use: Specifies regular committee members. Required.
Notes: You need several, but that is a whole other topic.
The maximum for the purposes of this class file is seven.

2.9 keyword

Format: `\keyword{ key1 }{ key2 }{ key3 }{ key4 }{ key5 }`
Use: A minimum of five keywords is required. They should not repeat words or phrases in the title. Required.
Notes: If there are more than five, the remaining keywords may be inserted into keyword five, separated by commas.

2.10 approvaldate

Format: `\approvaldate{ date }`
Use: Date should be in format *MMMM D, YYYY*. Required.
Notes: Be sure to include this when you submit this for the format check!

2.11 copyrightdate

Format: `\copyrightdate{ date }`
Use: This is a year, *YYYY*
Notes: Protects your intellectual property, don't you know...

3 Sections of the Dissertation

There are only certain subdivisions of a dissertation permitted by the USF formatting standards. Among these, certain ones are required. We mention only briefly subdivisions of the body of the dissertation, mentioning instead what the sequence of optional and required sections of the document as a whole, which are required, etc. Certain oddities of L^AT_EX processing should be heeded here. The printed portion of the document is enclosed, of course, by `\begin{document}` and `\end{document}`. Evoking the `\maketitle` command sets the title page and must occur as the *first* next command. The additional environments prior to the dissertation body are discussed here, in the order in which they appear. Next, the macro `\dissertation` starts the body of the dissertation, and after it there are additional requisite divisions of the paper, discussed here.

3.1 The Title Page

The title page of the dissertation is the center of the whole thing, as far as formatting is concerned. The environment is not explicitly elicited, but, assuming that the **titlepage** option has been selected, all of the macros from the preamble, described in Section 2 above, come into effect. The macro

```
\maketitle
```

generates the title page. This should be the first command issued *after*

```
\begin{document}.
```

A more significant reservation is that, L^AT_EX programming aside, all the information from the previous section when printed must fit onto the single title page. At the same time, spacing must be as specified by USF formatting guide. Therefore, it is necessary that you print it out and compare with the specifications. No programming is really good enough to cover all possible cases.

3.2 Dedication

An optional page may now occur in the dissertation: a dedication to anyone at all may be inserted. This is accomplished with the environment command

```
\begin{dedication}
```

followed by the text of the dedication, which will be appropriately indented and double-spaced. The dedication is concluded with

```
\end{dedication}
```

3.3 Acknowledgements

The highly customary Acknowledgements page is generated by the environment of the same name, which begins

```
\begin{acknowledgement}
```

and ends

```
\end{acknowledgement}
```

Again, indenting and other formatting details are handled correctly by `USFDissertation`.

3.4 Table of Contents

This is a standard section of L^AT_EX documents, and merely requires you to type the macro:

```
\tableofcontents
```

It is possible that some details of this table may not be perfectly pleasing to the eye, but it will satisfy the USF requirements. Honest.

3.5 List of Tables

Supposing that your dissertation contains tables, a list of them may be gotten (as usual) with the macro

```
\listoftables
```

3.6 List of Figures

Supposing that your dissertation contains figures, they must be listed up front, and the list is elicited as usual with

```
\listoffigures
```

3.7 Abstract

Your dissertation must have an abstract, and it is limited in length. Further, it must be formatted somewhat differently than the rest of the text, but nothing like the customary abstract formatting for math papers.

The environment beginning

```
\begin{abstract}
```

and ending

```
\end{abstract}
```

will generate the abstract, consisting of whatever you type between these two lines.

3.8 The Body of the Dissertation

Prior to beginning the body of the dissertation, you must issue the macro

```
\dissertation
```

to readjust all settings to what they should be inside the document. Everything that occurs up to this point is what you are required to submit for your format check, so, in a sense the entire must already exist at that time (otherwise, no table of contents).

Now things get serious, and the customary L^AT_EX commands such as `\chapter{...}` and so forth act in the way that the USF formatting standards wish them to act. Also, floats such as `table` and `figure` environments behave reasonably well. All of these things will be listed in the various lists in the prefatory material after two or three times of T_EXing your file.

3.9 References and Bibliography

If you happen to look at the USF standards, you will see there a distinction between References (works actually cited in the paper) and Bibliography (works useful in its preparation but not cited by it).

The aspiring candidate is invited to go to the trouble of rounding out the set of environments with one called `\references`.

As it stands,

```
\begin{thebibliography}{ number }
```

– the usual way of creating a bibliography – generates the References. This ends with

```
\end{thebibliography}
```

3.10 About the Author

The USF formatting scheme demands that you place a brief biography on the last page, which will be listed in the table of contents as the End Page.

The environment

```
\begin{bio}
```

– contents of the About the Author page –

```
\end{bio}
```

does just this, including the proper listing of the page in the table of contents.

4 Math Aids In the Class File

There are few actual macros proper to `USFDissertation`. This section lists, first, the math environments invoked by the use of the `thrmdefs` option, and, secondly, the means of making use of some of the other options that are purely mathematics-related.

4.1 Theorem-like environments

Made available by the `thrmdefs` option, these are just the usual gang of theorem-like things which may be of use to you. In the following subsections, each named environment is elicited in the usual way, i.e., beginning with

```
\begin{theorem-like environment name}
```

and ending with

```
\end{theorem-like environment name}
```

4.1.1 definition

This provides a `definition` environment labelled `DEFINITION`. It increments at section changes.

4.1.2 varremark and remark

Where `remark` sets its contents in emphasized text, `varremark` does not. Both are labelled with `REMARK`

4.1.3 conjecture and varconjecture

Similar to the pair of environments above, these are labelled `CONJECTURE`, but the text of the `varconjecture` is not emphasized.

4.1.4 proposition and varproposition

Similar to the pair of environments above, these are labelled `PROPOSITION`, but the text of the `varproposition` is not emphasized.

4.1.5 **fact and varfact**

Similar to the pair of environments above, these are labelled FACT, but the text of the **varfact** is not emphasized.

4.1.6 **note and varnote**

Similar to the pair of environments above, these are labelled NOTE, but the text of the **varnote** is not emphasized.

4.1.7 **observation and varobservation**

Similar to the pair of environments above, these are labelled OBSERVATION, but the text of the **varobservation** is not emphasized.

4.1.8 **example and varexample**

Similar to the pair of environments above, these are labelled EXAMPLE, but the text of the **varexample** is not emphasized.

4.1.9 **lemma**

This is numbered with relation to the Chapter in which it occurs, and is labelled LEMMA.

4.1.10 **theorem**

This is numbered with relation to the Chapter in which it occurs, and is labelled THEOREM.

4.1.11 **corollary, tcorollary, and pcorollary**

The plain **corollary** is for a Lemma, the **tcorollary** is for a Theorem, and the **pcorollary** is for a Proposition. That is, the numbering of the corollary (labelled COROLLARY) is with relation to a Lemma, Theorem, or Proposition.

4.1.12 **proof**

Proof environment, entitled *Proof.* and concluding with \square . Emphasized text label.

4.2 Other mathematics features

5 Getting it to Work

5.1 Read the README.txt file!

5.2 Float titles

USF asks you to include the entirety of a figure or table caption in the list of figures or list of tables. Here I hit a wall as far as straightforward L^AT_EX implementation. Unless you feel like messing with the low-level T_EX code to get the second and subsequent lines of a long figure or table caption title, here is a work-around you can use. It is seen in the “USFDissertationTemplate.tex” file which accompanies this.

Say that a figure caption is excessively long: `\caption{This shows the interaction of sets and subsets as components of nearly-continuous functions from the space of morphisms in general to morphisms from containers to elements of those containers.}` When you run L^AT_EX on your file, this line breaks up correctly in the list of figures, except that the second and third lines do not line up with the beginning of the first line. Instead, they start somewhere between the “g” and the “u” of the word “Figure”.

To force correct alignment, insert `\hspace*{.25in}` judiciously in the caption itself. Positioned correctly, this will not look terribly odd in the text, and it will fix the alignment problem in the list.

5.3 Non-sequitur

The following is not strictly a matter of getting this file to work, but rather an issue that has plagued certain writers.

A considerable amount of effort has been put into the issue of the placement of floats (Tables and Figures) in the document. Difficulties with excessive numbers of floats per chapter, it has been found, can, to a degree, be ameliorated by timely use of the `\clearpage` command. I suggest getting in touch with recent statistics graduates to find out how they have handled the matter.