A SOMEWHAT LONG-WINED
EXAMPLE THESIS
TO HELP WITH \LaTeX{} AND INTENDED FOR THE
DEPARTMENT OF MATHEMATICS AND STATISTICS

A Thesis
Presented to the
Faculty of
San Diego State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Applied Mathematics
with a Concentration in
Dynamical Systems

by
Joe Xavier Student III, Jr.
Winter 2038
SAN DIEGO STATE UNIVERSITY

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A Somewhat Long-Winded Example Thesis
to Help With \LaTeX{} and Intended For The
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Some Other Person
Department of Otherness

____________________________
Approval Date
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by
Joe Xavier Student III, Jr.
DEDICATION

Dedicated to me, as no one else is deserving.
We must know, we shall know.

– David Hilbert
ABSTRACT OF THE THESIS

A Somewhat Long-Winded Example Thesis
to Help With \LaTeX{} and Intended For The
Department of Mathematics and Statistics
by
Joe Xavier Student III, Jr.
Master of Science in Applied Mathematics with a Concentration in Dynamical Systems
San Diego State University, 2038

This document is a summary of some relevant commands needed to create a
Master’s thesis for the Department of Mathematics and Statistics using \LaTeX{}.
Included are examples of equations, figures, tables, and theorems. The formats listed in
this document have been approved by the Department of Mathematical Sciences and
the Graduate Division and Research. If you have any difficulties with any of the driver
or style files, please see your graduate adviser.
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2.2 Mapping $f(x)$ from the complex plane to itself.

2.3 The top graph is the function $z = \sin(r)/r$, while the bottom surface is the function $z = \cos(r)$.

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GLOSSARY

! the exclamation mark symbol.
” the double quote symbol.
@ the “at” symbol.
# the hash symbol.
Q the rational numbers.
R the real numbers.
Z the integers.
| the vertical bar symbol.

array A list of values identified by a numeric value.

binary Pertaining to numbers represented in base 2.

comment A remark that doesn’t affect the meaning of the code.

global Something that maintains its state when it leaves the current group.

local Something that only maintains its state until it leaves the group in which it was defined/changed.

LVM Logical Volume Manager.

SVD Singular Value Decomposition.
ACKNOWLEDGMENTS

I would like to thank Dr. Gauss for allowing me to work on this thesis even though he has been dead for so many years. I would also like to thank Dr. Bolzano for not having any comments on this thesis, and I would like to thank Dr. Knuth for being the only living person on my thesis committee, and for writing the wonderful TeX.

This thesis is partially protected against the evil forces of the Montezuma Publishing thesis reviewers by the magic of the Department of Mathematics and Statistics Master’s Thesis L\TeX Template.
CHAPTER 1

INTRODUCTION

You can save yourself 12 minutes now by not reading this document; later on the average payback is 105-fold when you run into problems.

1.1 History

In the early 1990s Richard Frost put together a \LaTeX\ style file for SDSU theses based on \LaTeX\ 2.09. Joe Mahaffy wrote an example thesis to guide students in the use of \LaTeX\ code. Since that time \LaTeX\ has been upgraded to \LaTeX\2e and the formatting requirements for SDSU have also changed. In 2004, Jiri Lebl and Mike O’Sullivan worked on a revision, upgrading to \LaTeX\2e. This \LaTeX\2e class file basically has almost nothing in common with the old \LaTeX\ style; it is a modification of the standard report class.

The class file \texttt{sdsu-thesis.cls} and this example are/have been maintained by

- Aug 2010 — current: Peter Blomgren, \texttt{blomgren@sdsu.edu}.

In September 2010, the “short” example was merged into the “long” example to form this document; this seemed like a reasonable thing to do.

While every effort is/has been made to make sure that the template and thesis style conforms to the SDSU Thesis Manual, \textbf{no guarantees can be made.} Depending on the thesis reviewer and his/her interpretation of what is Really Important\textsuperscript{TM} in the thesis manual, and his/her level of caffeination some theses fly through, and some get stuck even though they use the same template and style file.

PLEASE let the maintainer know of any and all feedback you get from the thesis reviewer so that the template and/or style file can be updated as necessary.

THANK YOU!!!

You may be able to completely bypass the Montezuma Publishing review process... Search for hidden clues in this document!

1.2 Purpose

This document illustrates some of the typesetting tasks that are commonly encountered in a thesis containing mathematics\textsuperscript{1}. All theses must follow the guidelines of the SDSU Thesis Manual for formatting. Most formatting issues will be automatically

\textsuperscript{1}http://en.wikibooks.org/wiki/LaTeX provides a wealth of information regarding \LaTeX, check it out.
handled by the \LaTeX class file included with the source file for this document, but there may be some special circumstances that will require some tinkering with spacing, pagebreaks, etc.

\LaTeX is a remarkably powerful package, but it does take some effort to learn. The best plan is to start with something already written and learn from the example. The current document was produced for this purpose. This document illustrates how the student should format the chapters and sections of the thesis, prepare the bibliography, and include other appropriate items commonly found in a technical document. The title page, signature page, acknowledgments page, abstract, and everything else are all formatted according to specifications of the SDSU Thesis Manual of 2004, once you enter the text to include.

For a general reference it is recommended that the student obtain the user’s guide and reference manual of Leslie Lamport [10]. The student should obtain copies of the files used to generate this document, then examine the text files used to generate the document and the \LaTeX output. The files for this example thesis are the following.

- **Makefile**: Contains “recipes” for building the thesis; type typing `make`, and `make thesis.pdf`.
- **abstract.tex**: Contains the abstract.
- **append.tex**: Contains all the text for appendices.
- **body.tex**: Contains all the text for chapters.
- **sdsu-thesis.cls**: Defines the layout and formatting.
- **thbib.bib**: Contains a bibliographical database.

**thesis.tex**:

1. Contains information for the title page, and other front-matter.
2. Includes the files `abstract.tex`, `body.tex`, and `append.tex`.
3. Defines the bibliographical style (`siam` in this example) and creates the bibliography using the file `thbib.tex`.

- **cos.eps, mapping.eps, plot2.eps, and somb.eps**: Encapsulated postscript files that are included by `body.tex` (in the subdirectory `Figures/`.)

Positioning and captioning of figures and tables should agree with the thesis manual. Occasionally, \LaTeX does not break when you want it too, so you have to add a `\newpage` command to get the correct break, such as when a section header starts at the bottom of a page or when paragraphs have widows or orphans.
1.3 Format of the Thesis

The Department of Mathematics and Statistics wants the student to use a standard technical format. This implies that equations, theorems, definitions, tables, etc. should be numbered $N.M$, where $N$ is the chapter number and $M$ is successively increased through the chapter. \LaTeX{} does this automatically. Numbering of the equations is on the right side of the page (default in \LaTeX{}). The student may use italics, small caps, or bold fonts to highlight important phrases. The code for creating theorems, definitions etc., is illustrated in this example thesis. Positioning and captioning of figures and tables should agree with the thesis manual. Occasionally, \LaTeX{} does not break when you want it too, so you have to add a \texttt{\newpage} command to get the correct break, such as when a section header starts at the bottom of a page or when paragraphs have widows or orphans.

Bibliographical citations are relatively easy. Here is one [1] and another citation [12] and we cannot forget Milnor [14]. Look at thbib.bib to see how to create the database for the bibliography.

You type new paragraphs by just leaving an empty line between them.

1.4 Processing \LaTeX{} Files

The best way to learn \LaTeX{} is to take advantage of someone else’s work from which you can model your document. This pseudo-thesis should give you a good working example to create your own document. The key commands to create any document are the following:

\begin{verbatim}
\documentclass[options]{class}
\begin{document}
  Insert any text you want in here.
\end{document}
\end{verbatim}

where \texttt{class} is some class type. For SDSU Thesis you would normally use the \texttt{sdsu-thesis} class. When you’re writing your thesis and want a draft printout you can also add options such as \texttt{savepaper} which will single space your document, and use larger margins. Most postscript viewers will allow you to print only a subset of pages as well. The standard for the final thesis is $1 1/2$ space. If you want double spaced then uncomment the \texttt{doublespace} option.

\texttt{README} files for the different operating systems accompany this distribution. Here we explain how to use the command line to process \LaTeX{} on a Unix/Linux system (or with modifications Mac OS X).
To process a \LaTeX{} document that you have named filename.tex, you simply type \texttt{latex filename}. For example, this document is generated by its driver file with \texttt{latex thesis}. If it is the first time and you have a bibliography, then you need the following sequence of commands:

\begin{verbatim}
latex filename
bibtex filename
latex filename
latex filename
\end{verbatim}

Unless you have added new references, the \texttt{bibtex filename} can be omitted. You will need to execute the \texttt{latex filename} command twice if there are any renumbering of items, like equations. When there are errors you can usually hit the carriage return and work through them\textsuperscript{2}. Other alternatives include typing either \texttt{x} or \texttt{q} to allow it to proceed. The errors will be kept in a file called \texttt{filename.log}. Be sure to pay attention to comments the \LaTeX{} produces as it gives you some warnings, such as when you need to make another run due to changes in the numbering of references or equations.

After you have performed the above procedure, you will have a file named \texttt{filename.dvi} (or \texttt{thesis.dvi} in our case) which is a device independent file. There are several means of viewing your output. If you are working in an Xwindow environment, then the simplest procedure is to type \texttt{xdvi filename.dvi}, which will open a window for viewing the \LaTeX{} document. It will not include any postscript figures, but it is automatically updated each time you latex your document. I highly recommend starting with this environment. (If you are on rohan and accessing saturn, then you will need the environment setup described below for ghostview.)

The second procedure for either viewing with ghostview or printing involves the conversion of the .dvi file to a postscript file. (You may want to examine \texttt{man dvips} for assistance.) The simplest way to convert the .dvi file to a postscript file is to type the following:

\begin{verbatim}
dvips -o filename.ps filename.dvi
\end{verbatim}

\textsuperscript{2}Do not panic if you get lots of errors; fix the first one! The following errors are often due to things being out-of-context due to the first error. ALWAYS fix the first error before worrying about the others!!! ALWAYS fix the first error before worrying about the others!!!
This creates the postscript file, filename.ps. If you do not need the entire document, then you can type:

```
dvips -px -ly -o filename.ps filename.dvi
```

where \( x \) is the number of the first page and \( y \) is the number of the last page.

Then to get a hard copy you should use the standard printing commands of your system. If you are on your own Linux system at home, usually `lpr filename.ps` will print the file.

In case your computer system has a different paper size set up as default then “letter” you can force a letter paper size by adding `-t letter` as an option to `dvips`. This can happen if you are running in a different language then American English.

The makefile simplifies many of the sequences of commands that you might use. For example, just type `make` to create a postscript file or `make view` to create a postscript and view it using a postscript viewer. Also, `make clean` will remove all the `.log` `.aux` `.ps` `.dvi` files.

### 1.5 HELP! — My Bibliography (or other Sub-part) in Not Working!

Bibliographies, Glossaries, and other “special” parts of a LaTeX document must be built separately (but not independent) from the main `latex thesis` build. The build work flow ::

<table>
<thead>
<tr>
<th>BUILD COMMAND</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>latex thesis</code></td>
<td>The first pass builds the structure, and produces “hooks” where things (like bibliographies, references, glossaries, etc.) need to go.</td>
</tr>
<tr>
<td><code>bibtex thesis</code></td>
<td>Build the bibliography (everyone needs this)</td>
</tr>
<tr>
<td><code>makeglossaries thesis</code></td>
<td>Build the glossary (if needed)</td>
</tr>
<tr>
<td><code>latex thesis</code></td>
<td>The second pass inserts bibliographies, references, glossaries, etc. into the document, but some cross-referencing is still undefined.</td>
</tr>
<tr>
<td><code>latex thesis</code></td>
<td>The third pass resolves the final cross-referencing and the document is complete.</td>
</tr>
</tbody>
</table>

How you set this up depends on your build environment; e.g. in February 2019 it was reported that in TeXmaker some of these build options are available under the `Quick Build command` from the `Options/Configure` menu. (See also section 1.6)
1.6 Building the Document using a Graphical User Interface

TEXMAKER (https://www.xm1math.net/texmaker/) is a popular cross-platform (Windows, MacOsX, Linux) \LaTeX\ editor / build-environment. Note that it is only a front-end, and you also need the actual \LaTeX\ (https://www.latex-project.org/get/#tex-distributions) back-end to make it run. Some \TeX\ distributions (e.g. MacTeX) include other editors / build-environments.

You have to configure TEXMAKER’s “quickbuild” setup so that all the pieces of the document get processed. Options → Configure Texmaker → Quick Build PdfLaTeX + Bib(la)tex + PdfLaTeX + View Pdf should get you up and running; this does not cover the building of glossaries. If you need one, there are several options for including the glossary build; please consult “Uncle Google” for further help.

1.7 \LaTeX\ Thesis Review, or “How to Bypass the Montezuma Publishing Review Process”

Some departments have their own authorized reviewer(s) for \LaTeX\ formatted thesis. Have your reviewer sign the \LaTeX\_Thesis\_Format\_Approval\_[OFFICIAL]\_docx form (in the Resources folder, and give that form to Montezuma Publishing along with your thesis.
CHAPTER 2

MISCELLANEOUS COMMANDS: AN INTRODUCTION TO EQUATIONS, THEOREMS, FIGURES AND TABLES

In this chapter we see how equations, theorems, figures and tables are created, enumerated and referenced. We also play around with lengths of chapter and section headings. For example, this chapter begins with a long chapter heading that must conform to the thesis manual. Later on there is a very long section heading. These examples show how the SDSU thesis class file automatically handles formatting.

2.1 Basic Math

You can have fun formulas, such as $x = 7y^2$. If you want the equations displayed you can use two dollar signs, $$ to enclose the mathematics, or you can use

\begin{equation*}
\text{math stuff}
\end{equation*}

as in

\begin{equation*}
\int_{\partial \Omega} \omega = \int_{\Omega} d\omega.
\end{equation*}

which produces

$$\int_{\partial \Omega} \omega = \int_{\Omega} d\omega.$$

There are several other ways to display equations. The code for this one (which you can see in body.tex) aligns all the equal signs.

\begin{align*}
(x + 2)^3 &= (x + 2)(x + 2)^2 \\
&= (x + 2)(x^2 + 4x + 4) \\
&= x^3 + 6x^2 + 12x + 8
\end{align*}

Notice that this last set of equations is numbered, but the previous one is not. The * in the \LaTeX code eliminates the numbering.
2.2 Equations

Enumeration of equations, theorems, definitions, tables, is handled automatically by \LaTeX. Each of these items may be given a label using \texttt{\label{<labelname>}}. The item can then be refereed to by \texttt{\ref{<labelname>}}. Below we demonstrate how to create and label an equation. Our first is a general differential equation,

\[ \dot{x} = f(t, x), \quad x(0) = x_0. \]  \hfill (2.4)

To see that the numbering is going fine we insert a matrix system as follows:

\[ \dot{y} = \begin{bmatrix} a_1 & 0 & \cdots & 0 \\ 0 & a_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & a_n \end{bmatrix} y. \]  \hfill (2.5)

The numbering is valuable when one wants to refer to the Equations (2.4) and (2.5). Note that when referring to Equation (2.4) you must capitalize the word equation. Also, when you enter a specific equation, figure, or table, \textit{e.g.}, Eqn. (2.4), then you should type a \~ between the word Eqn., Fig., or Table and its labeling number to prevent inappropriate division of the label at the end of a line.

To display an equation without numbering, one uses the math displaystyle mode which works as follows:

\[ \dot{y} = g(y), \]

which is an autonomous equation in $y$. The $y$ at the end of the last sentence is in standard math mode. Further information on equations is provided in Appendix A.

2.3 Theorems, etc.

The student needs to highlight important results such as theorems, hypotheses, or definitions. In this section we investigate how \LaTeX handles definitions, theorems, corollaries, etc.

**Definition 2.1.** A linear differential equation is asymptotically stable if and only if all eigenvalues, $\lambda$, of the operator matrix have negative real part.

We follow this with a couple of theorems and a corollary.

**Theorem 2.2.** If the matrix $A$ in the linear differential equation,

\[ \dot{y} = Ay, \quad y(0) = y_0, \]  \hfill (2.6)

is symmetric, then the solution of (2.6) is non-oscillatory.
Corollary 2.3. If the matrix $A$ in (2.6) is symmetric and has negative eigenvalues, then the solution is non-oscillatory and asymptotically stable.

In order to check how the numbering proceeds we insert here another theorem.

Theorem 2.4. If the matrix $H$ in the linear differential equation,

$$\dot{y} = Hy, \quad y(0) = y_0,$$  

(2.7)

is antisymmetric, then the solution of (2.7) is oscillatory.

The thesis.tex also defines environments for lemma and proposition though you can add more if you wish. For example sometimes it is useful to add an example style environment. See the preamble of the document for more information.

2.4 Numbering of Theorems, etc...

Everyone has their own favorite way to number things; by default all environments of types \{ THEOREM, COROLLARY, DEFINITION, EXAMPLE, LEMMA, PROPOSITION, REMARK \} share the same counter, which is reset at the start of a new chapter. If you want to change this, search for ‘‘Independent Counters’’ in thesis.tex.

2.5 Figures or How to Get into Real Trouble if You Take Advantage of What \LaTeX\ Can Do

This section shows how to display figures and refer to them in the text. \LaTeX\ does have the ability to insert postscript files using the graphicx package. Make sure to include \usepackage{graphicx} in your preamble, that is between the \LaTeX\ commands \documentclass and \begin{document}. See http://en.wikibooks.org/wiki/LaTeX/Importing_Graphics for information about importing graphics into your document.

To insert a figure that is formatted in encapsulated postscript, which must include a Bounding Box line which is named fname.ps you do the following:

\begin{figure}[ht]
\includegraphics[width=\linewidth]{fname.eps}
\caption{Insert a caption here. \label{figlabel} }
\end{figure}

to produce the figure. The [ht] argument to the figure command is a suggestion to \LaTeX\ to put the figure [h]ere, or at the [t]op of the page; [p] for a separate page is also possible. Avoid putting tables and figures at the [b]ottom of the page as this is frowned upon by the thesis manual; the preference is to put tables and figures right after they are first referenced, i.e. [h]ere, but at the [t]op of the following page is acceptable in styles note NEVER put anything in the margin like this!!!
cases where it does not fit here. You can make the suggestion stronger by saying \texttt{[h!]} for “[h]ere!” but the internal rules may still override your suggestion. “\texttt{\linewidth}” above can be replaced by some number of inches (or other size \LaTeX{} size measure such as \texttt{pt}, \texttt{em}, or \texttt{ex}). This will left justify the figure. Centering is a little more complicated. We place everything in a \texttt{minipage} environment:

\begin{figure}[ht]
  \centering
  \begin{minipage}{xin}
    \includegraphics[width=\linewidth]{fname.ps}
    \caption{Insert a caption here. \label{figlabel}}
  \end{minipage}
\end{figure}

To demonstrate how the department would like to see figures in the thesis the following is provided. If you are examining these files with \texttt{xdvi}, you will only see a blank spot. However, both printed and ghostview methods described in the previous chapter will allow viewing. Suppose that we create a figure to graph the curve

\[ y = \sin(\omega t), \quad (2.8) \]

where \( \omega \) is the circular frequency. Figure 2.1 is a graph of Equation (2.8), and figure 2.2 is an illustration of a mapping in the complex plane. The interval of time viewed is \( t \in [-5, 5] \). The figure reference should be denoted by either Fig. 2.1 or by Figure 2.1 with specific figures capitalized as noted here.

When you have a collection of figures and large figures, you may want to delay insertion of them until the end of the chapter. At the end of this chapter we are including a full page figure (Fig. 2.3) to demonstrate this \LaTeX{} command. Note that if you cannot obtain postscript figures or are having too much trouble using the technique described above, then you can use the \texttt{\vspace} command to provide an empty space in the manuscript, then use the old-fashioned technique of taping in your figure and photocopying it.

\section{2.6 Tables}

The Department of Mathematical Sciences does not have specific requirements on the exact layout of a table. However, the tables should be easily readable and properly labeled according to the regulations in the SDSU Thesis Manual. In this section we want to demonstrate how \LaTeX{} handles tables. More complicated examples can be found in Lamport’s book \cite{Lamport1986, Lamport1994}. We begin with a small table, given by Table 2.1 which inserts nicely into the text. Note that the same centering trick as was
Figure 2.1. This is a graph of the above equation, where the circular frequency is taken as \( \omega = 2 \). Note: if you need to cite a source (of e.g. a figure) in the caption, include the FULL CITATION, e.g. [§4.10.4 Figures, Montezuma Publishing, San Diego State University Dissertation and Thesis Manual: Policies, Procedures and Format, Spring 2010.] — The Easiest way to achieve this is to first use the \cite{...} command, build the document, then replace the cite command with the appropriate text copied from the generated thesis.bib file. If the figure caption is the only place the source is cited, add a \nocite{...} command to ensure that it shows up in the bibliography.

employed for figures is done here and we set the width of the \texttt{minipage} environment to 1.9 inches.

The manual however allows for the caption to be a little wider if the table is really small and so we can use a wider \texttt{minipage} and then center the table inside there. See for example Table 2.2 where we used width of 3.5 inches.

Note that you can use the \texttt{center} environment instead of \texttt{centering} but that might add a little bit of unwanted whitespace. With \texttt{centering} on the other hand, you might have to put braces around the text you wish to center and sometimes need to add a \texttt{par}. If you use it inside a \texttt{minipage}, \texttt{table} or \texttt{figure} environment, you don’t have to really worry about that. Note however that without the use of \texttt{minipage} you
Figure 2.2. Mapping $f(x)$ from the complex plane to itself.

cannot center the caption as it automatically left aligns itself to conform with the thesis manual.

Tables can also be left aligned see for example Table 2.3. Here we don’t use the minipage environment, but we must then add linebreaks so that the table caption does not go wider then the table itself. We need to add then two titles, one for the list of tables and one for the caption here. The former will not have line breaks and the latter will.

Sometimes a table might not fit onto a single page, in this case you must not use the table environment, but instead the longtable environment. Do note that longtable automatically centers so you need not worry about that. See Table 2.4 for some absolutely random numbers. To use longtable environment you must include the longtable package in your preamble. see the note in thesis.tex on how to fix the longtable entries in the “List of Tables” if they are incorrect.
Table 2.1. A Small Table for Listing Some Parameters Used in Some Numerical Procedure.

<table>
<thead>
<tr>
<th>Trial</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>π</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>2π</td>
</tr>
</tbody>
</table>

The Department of Mathematical Sciences does not have specific requirements on the exact layout of a table. However, the tables should be easily readable and properly labeled according to the regulations in the SDSU Thesis Manual.

Table 2.2. Another Small Table for Listing Some Parameters Used in a Numerical Procedure.

<table>
<thead>
<tr>
<th>Trial</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>π</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>2π</td>
</tr>
</tbody>
</table>

Table 2.3. Another Such Table but Left Aligned

<table>
<thead>
<tr>
<th>Trial</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>π</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>2π</td>
</tr>
</tbody>
</table>
Table 2.4. A Table of Some Totally Random Numbers. Often (when there are other tables defined before the longtable) it is necessary to issue the command \clearpage prior to the longtable environment; otherwise table-numbering and page-ordering of table/longtable object may get VERY strange.

<table>
<thead>
<tr>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>16883.20050 × 64.19591</td>
<td>23174(^{2905})</td>
<td>(5112, 5468, 27117)</td>
</tr>
<tr>
<td>7216.3398 × 12239.16770</td>
<td>19961(^{9127})</td>
<td>(16136, 21997, 26051)</td>
</tr>
<tr>
<td>15977.29588 × 5732.19698</td>
<td>14995(^{26728})</td>
<td>(28634, 14278, 17183)</td>
</tr>
<tr>
<td>24699.2338 × 8803.18474</td>
<td>19221(^{28853})</td>
<td>(18539, 6044, 19259)</td>
</tr>
<tr>
<td>2144.11156 × 24727.15793</td>
<td>18372(^{28126})</td>
<td>(28032, 2375, 15319)</td>
</tr>
<tr>
<td>4391.18511 × 4548.30442</td>
<td>1720(^{1369})</td>
<td>(3406, 21419, 16364)</td>
</tr>
<tr>
<td>30135.17285 × 30643.14550</td>
<td>9216(^{213})</td>
<td>(23353, 27690, 19435)</td>
</tr>
<tr>
<td>19438.13461 × 25479.5929</td>
<td>2137(^{3868})</td>
<td>(30657, 17930, 22240)</td>
</tr>
<tr>
<td>26015.13194 × 24615.8566</td>
<td>17585(^{10358})</td>
<td>(13114, 15259, 12079)</td>
</tr>
<tr>
<td>14483.18666 × 730.30848</td>
<td>16033(^{18015})</td>
<td>(28723, 30583, 27231)</td>
</tr>
<tr>
<td>28936.21168 × 22153.15603</td>
<td>7838(^{2847})</td>
<td>(8315, 13767, 4984)</td>
</tr>
<tr>
<td>12183.11656 × 22915.1655</td>
<td>4903(^{3341})</td>
<td>(26271, 13469, 20927)</td>
</tr>
<tr>
<td>3861.26584 × 3418.15940</td>
<td>8299(^{22084})</td>
<td>(16670, 6379, 5349)</td>
</tr>
<tr>
<td>1917.2334 × 3164.29148</td>
<td>31271(^{24332})</td>
<td>(18534, 14106, 32170)</td>
</tr>
<tr>
<td>21381.22421 × 13170.26365</td>
<td>1836(^{24826})</td>
<td>(16512, 3492, 29730)</td>
</tr>
<tr>
<td>19854.29763 × 10431.8013</td>
<td>856(^{1247})</td>
<td>(11431, 16797, 12547)</td>
</tr>
<tr>
<td>748.699 × 18926.6097</td>
<td>2617(^{21261})</td>
<td>(9262, 31765, 19764)</td>
</tr>
<tr>
<td>826.17531 × 1102.229</td>
<td>6144(^{23524})</td>
<td>(13399, 32510, 25360)</td>
</tr>
<tr>
<td>5457.16254 × 28852.2419</td>
<td>3340(^{25847})</td>
<td>(12851, 11353, 26704)</td>
</tr>
<tr>
<td>17098.22785 × 10733.29645</td>
<td>23533(^{11432})</td>
<td>(15804, 29630, 14049)</td>
</tr>
<tr>
<td>4297.6124 × 13047.24061</td>
<td>6951(^{30578})</td>
<td>(25163, 7180, 3955)</td>
</tr>
<tr>
<td>15919.20579 × 3697.8512</td>
<td>26036(^{19951})</td>
<td>(4596, 28456, 23292)</td>
</tr>
<tr>
<td>30444.8539 × 18772.43880</td>
<td>25637(^{24662})</td>
<td>(2345, 22515, 15427)</td>
</tr>
<tr>
<td>13777.5551 × 12290.27827</td>
<td>9848(^{18414})</td>
<td>(8106, 1141, 25365)</td>
</tr>
<tr>
<td>5916.26304 × 32545.9871</td>
<td>9456(^{20356})</td>
<td>(13568, 17968, 13625)</td>
</tr>
<tr>
<td>752.22564 × 9313.24044</td>
<td>20240(^{17852})</td>
<td>(25921, 11852, 10721)</td>
</tr>
<tr>
<td>17816.14197 × 468.475</td>
<td>27975(^{6019})</td>
<td>(12765, 23034, 15867)</td>
</tr>
<tr>
<td>51180.31140 × 17008.23777</td>
<td>4288(^{10545})</td>
<td>(23555, 14160, 20001)</td>
</tr>
<tr>
<td>11143.27728 × 5201.24768</td>
<td>28480(^{27765})</td>
<td>(1313, 19756, 15238)</td>
</tr>
</tbody>
</table>

(table continues)
Table 2.4 (Continued)

<table>
<thead>
<tr>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>19165.12910 × 27090.29887</td>
<td>30726\textsuperscript{8520}</td>
<td>(30355, 31201, 3727)</td>
</tr>
<tr>
<td>3607.11199 × 26761.19474</td>
<td>9611\textsuperscript{25133}</td>
<td>(3715, 620, 29421)</td>
</tr>
<tr>
<td>14260.24175 × 10813.14933</td>
<td>2551\textsuperscript{5774}</td>
<td>(6694, 27319, 1486)</td>
</tr>
<tr>
<td>1691.28633 × 21243.16929</td>
<td>15030\textsuperscript{1385}</td>
<td>(11252, 12149, 32111)</td>
</tr>
<tr>
<td>19772.9737 × 30544.23499</td>
<td>13344\textsuperscript{8975}</td>
<td>(17492, 50, 18586)</td>
</tr>
<tr>
<td>9857.3765 × 19207.6510</td>
<td>18025\textsuperscript{10614}</td>
<td>(17324, 19518, 13165)</td>
</tr>
</tbody>
</table>

A larger table, given by Table 2.5 and reproduced from another document, then you may need to allow an entire page for the table. This is done by typing the command \begin{table}[p]. This test example is included in the minipage environment to show how a footnote\footnote{We also need to see how a regular footnote appears in the text, so one was inserted here. Multiple lines are easily handled by \LaTeX.} can be added to a table. Several problems have been noted before on how \LaTeX handles the location of the table in the text.

2.7 Potential Pitfalls

(Oh yeah, there must be text between sectioning commands...)

2.7.1 Tables and Figures

There is a conflict between the \usepackage{subfig}, \usepackage{caption} and the \texttt{sdsu-thesis.cls} class specification. The long table captions show up correctly (bold and left aligned with table). Use \usepackage{subfigure} instead and all captions, as well as the list of tables page show up ok.

If you insist on \usepackage{subfig}, make sure to first issue the command \usepackage[bf,labelsep=period,textfont=bf]{caption} where the first "bf" makes the labels "Figure n" bold; labelsep=period says "use '.' instead of ':'; and textfont=bf makes the caption text bold. This may solve your subfig problems.

Table captions (“table titles” [15]) go ABOVE the table, must be in \textit{headline style} where “all major words are capitalized,” and there is no period at the end of the caption; in figure captions only the first word is capitalized, and there is a period at the end. — \textbf{THE STYLE DOES NOT CURRENTLY ENFORCE THIS, YOU HAVE TO DO IT MANUALLY.}

Charts, graphs, diagrams, maps, photographs, and other graphic illustrations should all be labeled as \textit{Figures} [15, §4.6.9, and §4.10.4]. Figure captions are capitalized...
Table 2.5. Computations for Products of the \textit{RRN} Genes at Different Growth Rates

<table>
<thead>
<tr>
<th>$\tau$ (min)</th>
<th>100</th>
<th>60</th>
<th>40</th>
<th>30</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C$ period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$D$ period</td>
<td>30</td>
<td>27</td>
<td>25</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>$V_0$</td>
<td>0.437</td>
<td>0.577</td>
<td>0.815</td>
<td>1.15</td>
<td>1.63</td>
</tr>
<tr>
<td>$\bar{c}^a$</td>
<td>11.1</td>
<td>16.8</td>
<td>22.1</td>
<td>28.1</td>
<td>31.4</td>
</tr>
<tr>
<td>$\bar{c}_{85}^b$</td>
<td>1.73</td>
<td>2.68</td>
<td>3.65</td>
<td>4.81</td>
<td>5.57</td>
</tr>
<tr>
<td>$\bar{c}_{57}^c$</td>
<td>1.36</td>
<td>1.98</td>
<td>2.43</td>
<td>2.87</td>
<td>2.96</td>
</tr>
<tr>
<td>$\bar{c}_{85}(\times 100)/\bar{c}^d$</td>
<td>15.6</td>
<td>15.9</td>
<td>16.5</td>
<td>17.1</td>
<td>17.7</td>
</tr>
<tr>
<td>$\bar{c}_{57}(\times 100)/\bar{c}^e$</td>
<td>12.3</td>
<td>11.8</td>
<td>11.0</td>
<td>10.2</td>
<td>9.44</td>
</tr>
<tr>
<td>$\bar{c}<em>{85}/\bar{c}</em>{57}$</td>
<td>1.27</td>
<td>1.35</td>
<td>1.50</td>
<td>1.68</td>
<td>1.88</td>
</tr>
<tr>
<td>$r^f$</td>
<td>3.75</td>
<td>10.27</td>
<td>22.56</td>
<td>38.42</td>
<td>56.98</td>
</tr>
<tr>
<td>$c_{max}^g$</td>
<td>11.28</td>
<td>17.04</td>
<td>22.33</td>
<td>28.36</td>
<td>31.77</td>
</tr>
<tr>
<td>$c_{max}/c_{min}^h$</td>
<td>1.041</td>
<td>1.036</td>
<td>1.027</td>
<td>1.024</td>
<td>1.026</td>
</tr>
</tbody>
</table>

\(a\times 1000 \text{ ribosomes/}\mu\text{m}^3\).

\(b\times 1000 \text{ ribosomes/}\mu\text{m}^3\), representing the average concentration of the product of the \textit{rrn} gene located at 85\textsuperscript{′}.

\(c\times 1000 \text{ ribosomes/}\mu\text{m}^3\), representing the average concentration of the product of the \textit{rrn} gene located at 57\textsuperscript{′}.

\(d\)Percentage of $\bar{c}$ produced by the \textit{rrn} gene located at 85\textsuperscript{′}.

\(e\)Percentage of $\bar{c}$ produced by the \textit{rrn} gene located at 57\textsuperscript{′}.

\(f\)Initiations/min/gene.

\(g\times 1000 \text{ ribosomes/}\mu\text{m}^3\), representing the maximum concentration during the cell cycle.

\(h\)Ratio of maximum to minimum concentration during the cell cycle.
Figure 2.3. The top graph is the function $z = \sin(r)/r$, while the bottom surface is the function $z = \cos(r)$. 
sentence style in the text; therefore, the List of Figures entries should be in sentence style.

All tables and figures must be referenced in text prior to their appearance. Those references should be by number.

2.7.1.1 Centered Tables Figures

It is not as simple as adding \centering into the figure or table environment as that will center the caption on the page rather then left align it with the left edge of the figure or table. So the way to solve this is to figure out the width of the figure or table and add it in a minipage and center that. For example if our table is 2 inches wide when typeset, then we could do

\begin{table}[ht]
  \centering
  \begin{minipage}{2in}
    \caption{Caption goes here}
    ... here is your table ...
  \end{minipage}
\end{table}

2.7.2 Margins

It is believed that the sdsu-thesis.cls template complies with the SDSU thesis manual: 1.25 inch left, 1 inch top, bottom and right. But your printout may not give the right measurement, if your printer/printer-driver scales the document. You may have to turn off scaling and/or tweak the settings in the sdsu-thesis.cls file.

Someone said: “Some laser printers don’t do the margins correctly, for example my printer shifts the page a bit. You can correct this with the \hoffset and \voffset lengths as:

\hoffset -0.0625in
\voffset 0.15625in”

2.7.3 Bad Pagebreaks

Sometimes LaTeX does not do exactly what you want with respect to pagebreaks. To solve this you can manually add a \pagebreak command where it should break, or you could add \enlargethispage{12pt} to make a page slightly larger if needed; though I’m not sure how the thesis reviewer will look on such transgressions, so do that at own risk.
Bad pagebreaks in the table of contents (or list of tables/figures): If you get a bad pagebreak in a table of contents you can force a pagebreak by:
\addtocontents{toc}{\protect\pagebreak} you add this at the point in your document that corresponds to that place in the table of contents. For list of tables and list of figures, replace ‘toc’ in the line above with ‘lot’ or ‘lof.’

2.7.4 Bad Linebreaks

Bad linebreaks in chapter, section (subsection, etc...), or table/figure caption titles: This classfile tries to make all titles conform to the requirements of the thesis manual, but it is possible that it gets things wrong and you may want to add linebreaks (the \ command) yourself. However, the table of contents title should not have any linebreaks. The way you do it is to add an optional argument to \chapter, \section, \caption as in:

\chapter[Title for Table of Contents]{Title With\Linebreaks}

Note that for \caption’s in figures and tables you might have to do this whenever you have a small figure or table as the table/figure environment cannot make the caption only as long as the figure since it doesn’t know how large the figure is until it typesets everything. See example above and more examples in the long-example directory. You can also solve the \caption issue with minipage in the same way we do centering, see section 2.7.1.1.

2.7.5 Vertical Space

This classfile tries to make all the vertical space as required, but sometimes you may need to modify what it does, or you just need to insert some vertical space. You use the \vspace and \vspace* commands (see LATEX manual). You can use positive or negative length there and \vspace* makes sure the space appears even if there is a pagebreak in between. For example to add 2 inches of space you can add \vspace{2in}.

2.7.6 Bold Math in the Thesis: $x = \pi$

Math in section titles need to be bold, but cannot be bold in the Table of Contents. This can be achieved by providing two arguments to the sectioning command, e.g.

\subsection[Non-Bold Math in the TOC: $x=2\pi/e$]{Bold Math in the Thesis: $\mathbf{x=\pi}$}
CHAPTER 3
SECTIONING — THE MIDDLE

Middle chapter. Here we put the middle things, that is, things that are in the middle and not in the beginning, nor in the end. Here we also test all the section, subsection, and other headings.

Note that CHAPTER TITLES need to be in ALL CAPS — YOU have enter the chapter titles in ALL CAPS!!!

3.1 A Section

Some section text. Note that there should ALWAYS be some text in between two sectioning levels; a \section directly followed by a \subsection will not go through the review.

3.1.1 A Subsection With a Very Long Title To See How That Will Look When Printed

Some subsection text.

3.1.1.1 A Subsubsection

Some subsubsection text. If you are using this, you are probably over-organizing things.

3.1.1.1.1 A Subsubsubsection

Some subsubsubsection text. If you are using this, you are definitely over-organizing things.

3.1.1.1.1 A Paragraph. Some paragraph text. You never really get this deep — don’t be ridiculous.

3.1.2 A Friend of §3.1.1

This subsection is here because §3.1.1 cannot stand alone; (sub)”-sectioning commands are supposed to divide the text into logical chunks.

3.2 A 2nd Section

Yeah, no (sub)section can stand alone; so if there is a §3.1 there must be a §3.2. §3.1.1, needs a “friend”; and so does §3.1.1.1, and §3.1.1.1.1.
Bending the Rules :: A Single “Section” Without a Number

Occasionally — maybe just to spite The Man™ — you may “need” a single (sub)"^{n}“-section; in that case you can circumvent the rules by not numbering it, currently the \section*{...} commands do not produce the desirable results; the best quick-fix is:

\vspace{\baselineskip}
\centerline{\textbf{\large A ‘‘Section’’ Without a Number}}
\vspace{0.25\baselineskip}
\centerline{\large Section*--section}

Update 9/8/2019. The \section* command now works.

Subsection*

Update 9/8/2019. The \subsection* command now works.

Subsubsection*

Update 9/8/2019. The \subsubsection* command now works.

Subsubsubsection*

Update 9/8/2019. The \subsubsubsection* command now works.
CHAPTER 4
REFERENCING

Below a list of references are provided in the acceptable format for Master's thesis submission. References are to be numbered and should appear either alphabetically or in the order of appearance in the text. (\LaTeX does the former for the student.) For students using \LaTeX these are obtained using the plain style with \TeX{}\TeX. The Department of Mathematics and Statistics will accept either the plain style or the SIAM style. (For the SIAM style, it is recommended that you use the included \texttt{siammod2019.bst} version.) There are references for journal articles [1], books and booklets [5, 21], inbooks, incollections, and inproceedings [4, 6, 19]. \textit{Note that when you have more than one citation in a single bracket they must be in increasing numerical order!} Other sources may be proceedings [3], technical reports (techreport) [17], theses (mastersthesis, or PhDthesis) [7], or unpublished material [18]. This should provide a fairly comprehensive list for any material that the student may encounter. For additional assistance, see the graduate adviser in your area of concentration.

If you cite a website [16] and you cannot find the year on the website, you should put "n.d." (not dated) at the end. (this is true for other reference also.) It must also have the word "accessed" and the month and year you access the website. You can change how things with no author(s) are sorted in the bibliography by supplying a key entry (see \texttt{thbib.bib}), \textit{e.g.} this news release [20] will be sorted under “U,” the leading letter of the publishing agency (as preferred by the thesis publisher).

This [8] is an example of a patent. \textit{Notice}: how the \texttt{month} and \texttt{year} fields in \texttt{thbib.bib} have been abused to force the "correct" format.

Some articles [2] have many authors, pay attention to how (1) the entry looks in the \texttt{thbib.bib} file, and (2) in the final bibliography.

\textit{All} the entries that appear in the bibliography \textbf{must} appear somewhere in the text. This is automatically true UNLESS you use the \texttt{\textbackslash nocite{}\{} command. In order to provide additional bibliography-entry-examples, this is NOT TRUE for this document. Additionally, every figure and table \textbf{must} be referenced in the text.
UNTOLD SECRETS

Some departments and programs have their own \LaTeX -thesis reviewer(s). This alternative review **bypasses the Montezuma Publishing review**, and tends to be FASTER and more understanding of \LaTeX quirks. Please read \LaTeX\_Thesis\_Format\_Details\_[UNOFFICIAL].pdf in the Resources folder.

**Authorized Reviewers (April 3, 2024):**

- Computational Sciences
  - Peter Blomgren \langle blomgren@sdsu.edu \rangle
- Computer Science
  - Peter Blomgren \langle blomgren@sdsu.edu \rangle
- Mathematics and Statistics
  - Peter Blomgren \langle blomgren@sdsu.edu \rangle
  - Michael O’Sullivan \langle mosullivan@sdsu.edu \rangle
- Physics
  - Fridolin Weber \langle fweber@sdsu.edu \rangle

This is not really a secret, but calling it a secret makes it more exciting than “section 1.7: Thesis Review.”

“How Do I Write a Thesis?”

Writing a thesis may seem like a daunting task, but the following example shows how you too can sound incomprehensible:
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech</td>
<td>“I can’t!” “Bruh!”</td>
</tr>
<tr>
<td>Email</td>
<td>“I cannot.”</td>
</tr>
<tr>
<td>Essay</td>
<td>“I am unable to do that.”</td>
</tr>
<tr>
<td>Term Paper</td>
<td>“I do not find myself in the circumstances for it to be possible that I could potentially be able to have the capacity to do that.”</td>
</tr>
<tr>
<td>Thesis</td>
<td>“The author does not find the circumstances thus described to be advantageous enough to allow the author to have the potential to act, in their own capacity, upon the course of events thus previously described. Therefore, the author is of the unfortunate conclusion that they are unable to perform the actions necessary to complete the task at hand in such a fashion as to leading to a satisfactory conclusion.”</td>
</tr>
<tr>
<td>ChatGPT</td>
<td>“In the labyrinthine expanse of human endeavor, where ambition collides with the immutable walls of circumstance, ’I cannot’ emerges not merely as a declaration but as an eloquent testament to the boundaries that sculpt our journey, a nuanced acknowledgment of the intricate dance between potentiality and the tangible limits of reality.”</td>
</tr>
</tbody>
</table>

Table 4.1. Writing sample, adopted from r/IncreasinglyVerbose.
CHAPTER 5
GRADUATING

It is a Good Idea to check the current academic calendar\textsuperscript{1} and make note of all deadlines; among other things, you need to Apply to Graduate\textsuperscript{2} and then make sure your thesis is “published” by the Publication Deadline. Get your thesis signature page signed by your committee members; get the Report of Final Exam\textsuperscript{3} signed by your Graduate Advisor (who may or may not be your thesis chair). If your department/program has a \LaTeX-thesis reviewer, that sentient being needs to sign off on the formatting of the thesis; otherwise the formatting will be reviewed by Montezuma Publishing (fee and deadline(s) apply).

\textsuperscript{1}https://registrar.sdsu.edu/calendars/academic_calendars
\textsuperscript{2}https://advising.sdsu.edu/graduation/apply_to_graduate
\textsuperscript{3}https://grad.sdsu.edu/current_grad_students/forms#collapsed14e1524
BIBLIOGRAPHY


MORE INFORMATION ON EQUATIONS

To demonstrate how an appendix should be inserted into the thesis we have provided three appendices. This first appendix illustrates some more advanced techniques to improve the appearance of your equations. Below is a system of partial differential equations from a model for cellular control by an external nutrient.

The equations are complicated and \LaTeX{} tends to allow them to run into each other. To prevent this we have used the \texttt{\textbackslash vrule} command to separate them. Note this is an ordinary \LaTeX{} command and is not in L. Lamport’s book [10]. Furthermore, we have some complicated boundary conditions that we needed to align, so we used the array command, but to get the equations looking right we also needed the \texttt{\textbackslash dfrac} command instead of the \texttt{\textbackslash frac} command. The equations for our model are as follows:

\begin{align}
\dot{U}_1(t) &= \tilde{f}(W_1(t-T)) - U_1(t) + \gamma_1 U_2(R\sigma, t), \\
\dot{W}_1(t) &= -\hat{b}_3 W_1(t) + \gamma_3 W_2(R\sigma, t), \\
\frac{\partial U_2}{\partial t} &= D_1 \nabla^2 U_2 - U_2 - \tilde{f}(W_1(t-T)) - \gamma_1 U_2(R\sigma, t), \\
\frac{\partial V_2}{\partial t} &= D_2 \nabla^2 V_2 - b_2 V_2 + c_0(U_2 + U_1(t)), \\
\frac{\partial W_2}{\partial t} &= D_3 \nabla^2 W_2 - b_3 W_2 + (\hat{b}_3 - b_3) W_1 - \gamma_3 W_2(R\sigma, t) + k \left[ \left(\frac{D_3}{r^2}\right) \frac{d}{dr} \left( r^2 \frac{d h}{dr} \right) - b_2 h \right] V_2(R, t) - h \dot{V}_2(R, t),
\end{align}

(A.1)

for $t > 0$ and $R\sigma < r < R$ and with the boundary conditions:

\begin{align*}
\frac{\partial U_2(R\sigma, t)}{\partial r} &= \beta_1 U_2(R\sigma, t), \\
\frac{\partial U_2(R, t)}{\partial r} &= 0, \\
\frac{\partial V_2(R\sigma, t)}{\partial r} &= 0, \\
\frac{\partial V_2(R, t)}{\partial r} &= 0, \\
\frac{\partial W_2(R\sigma, t)}{\partial r} &= \beta_3 W_2(R\sigma, t), \\
\frac{\partial W_2(R, t)}{\partial r} &= 0.
\end{align*}

Notice that the system is numbered only once by (A.1) and that this is centered as best we can on one line. All other lines have the \texttt{\textbackslash nonumber} command.

A.1 Theorems

The appendix can also include technical theorems and lemmas which are call in the same manner as before. For example,
Theorem A.1. The system of equations (A.1) can exhibit periodic solutions for certain parameter values.

Proof. The argument uses Hopf bifurcation techniques and is very complicated. See Mahaffy et al [13].
APPENDIX B
LISTS AND QUOTATIONS
LISTS AND QUOTATIONS

The thesis will rarely use list environments, but they are valuable for résumés. For more information on creating a résumé you may want to see the author of this document (you also need to learn quite a bit about \parbox commands). To create a list you will want to use one of itemize, enumerate, or description. For example:

**continuous** A function $f$ is **continuous** at $x$ if and only if for every $\varepsilon > 0$ there exists a $\delta(x) > 0$ such that whenever $|y - x| < \delta$, $|f(y) - f(x)| < \varepsilon$.

**uniformly continuous** A function $f$ is **uniformly continuous** if and only if for every $\varepsilon > 0$ there exists a $\delta > 0$ such that whenever $|y - x| < \delta$, $|f(y) - f(x)| < \varepsilon$ independent of $x$ and $y$.

**equicontinuous** A family of functions $f_n$ is **equicontinuous** at a point $x$ if and only if for every $\varepsilon > 0$ there exists a $\delta > 0$ such that whenever $|y - x| < \delta$, $|f_n(y) - f_n(x)| < \varepsilon$ for all functions $f_n$.

\LaTeX{} provides an environment for block quotations. To agree with the thesis manual follow the format below for a quotation exceeding four lines. From Lewis Carroll’s *Hunting of the Snark* we hear the Bellman tell his crew:

The Bellman himself they all praised to the skies–
Such a carriage, such ease and such grace!
Such solemnity, too! One could see he was wise,
The moment one looked in his face!

He had bought a large map representing the sea,
Without the least vestige of land:
And the crew were much pleased when they found it to be
A map they could all understand.

“What’s the good of Mercator’s, North Poles and Equators,
Tropics, Zones, and Meridian Lines?”
So the Bellman would cry: and the crew would reply,
“They are merely conventional signs!”

“Other maps are such shapes, with their islands and capes!
But we’ve got our brave Captain to thank”
(So the crew would protest) “that he’s bought us the best–
A perfect and absolute blank!”
APPENDIX C

A NOTE ON COMMITTEE COMMENTS
A NOTE ON COMMITTEE COMMENTS

Language is a funny thing; when unsure, always seek to clarify. “With the greatest respect, I only have a few minor comments on your very interesting thesis topic.” (see figure C.1 for “translation.”)

<table>
<thead>
<tr>
<th>What the British say</th>
<th>What the British mean</th>
<th>What others understand</th>
</tr>
</thead>
<tbody>
<tr>
<td>I hear what you say</td>
<td>I disagree and do not want to discuss it further</td>
<td>He accepts my point of view</td>
</tr>
<tr>
<td>With the greatest respect...</td>
<td>I think you are an idiot</td>
<td>He is listening to me</td>
</tr>
<tr>
<td>That’s not bad</td>
<td>That’s good</td>
<td>That’s poor</td>
</tr>
<tr>
<td>That is a very brave proposal</td>
<td>You are insane</td>
<td>He thinks I have courage</td>
</tr>
<tr>
<td>Quite good</td>
<td>A bit disappointing</td>
<td>Quite good</td>
</tr>
<tr>
<td>I would suggest...</td>
<td>Do it or be prepared to justify yourself</td>
<td>Think about the idea, but do what you like</td>
</tr>
<tr>
<td>Oh, incidentally/ by the way</td>
<td>The primary purpose of our discussion is...</td>
<td>That is not very important</td>
</tr>
<tr>
<td>I was a bit disappointed that</td>
<td>I am annoyed that</td>
<td>It doesn’t really matter</td>
</tr>
<tr>
<td>Very interesting</td>
<td>That is clearly nonsense</td>
<td>They are impressed</td>
</tr>
<tr>
<td>I’ll bear it in mind</td>
<td>I’ve forgotten it already</td>
<td>They will probably do it</td>
</tr>
<tr>
<td>I’m sure it’s my fault</td>
<td>It’s your fault</td>
<td>Why do they think it was their fault?</td>
</tr>
<tr>
<td>You must come for dinner</td>
<td>It’s not an invitation, I’m just being polite</td>
<td>I will get an invitation soon</td>
</tr>
<tr>
<td>I almost agree</td>
<td>I don’t agree at all</td>
<td>He’s not far from agreement</td>
</tr>
<tr>
<td>I only have a few minor comments</td>
<td>Please re-write completely</td>
<td>He has found a few typos</td>
</tr>
<tr>
<td>Could we consider some other options</td>
<td>I don’t like your idea</td>
<td>They have not yet decided</td>
</tr>
</tbody>
</table>

Figure C.1. What do the comments from your advisor and/or thesis committee really mean?