First Line of Your Thesis/Dissertation Title

Second Line of Title if Necessary

Three Line Limit

Isaac Newton

A thesis submitted to the faculty of
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Master of Science

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ABSTRACT

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Three Line Limit

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Master of Science

The abstract is a summary of the dissertation, thesis, or selected project with emphasis on the findings of the study. The abstract must not exceed 1 page in length. It should be printed in the same font and size as the rest of the work. The abstract precedes the acknowledgments page and the body of the work.

Keywords: James Watt, steam engines, nonlinear deflections, thesis templates

ACKNOWLEDGMENTS

Students may use the acknowledgments page to express appreciation for the committee members, friends, or family who provided assistance in research, writing, or technical aspects of the dissertation, thesis, or selected project. Acknowledgments should be simple and in good taste.

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NOMENCLATURE

B	Barrier to extract information about a product from the product itself
$\overline{D}$	Macroscopic strain rate
D_0	First component of strain rate tensor
D_k^N	Normal direction of the k-th lamina, also an axis for the lamina reference frame
D_k^R	Rolling direction of the k-th lamina, also an axis for the lamina reference frame
D_k^T	Transverse direction of the k-th lamina, also an axis for the lamina reference frame
$\overline{d}$	Average grain size
Δg	Volume of discretized bins in Fundamental Zone
E	Young's modulus
$E_m(wxyz)$	Fourier coefficients representing Young's modulus in the $wxyz$ direction for the m-th bin of the Fundamental Zone
F	Estimated rate at which information is extracted from a product
F_m	Fourier coefficients of crystal volume fraction in the m-th bin of the Fundamental Zone
G	Shear modulus
g	Euler angles from Sample to Crystal reference frames
g_{wx}	Orientation matrix of Euler angles from Sample to Crystal reference frames
$\dot{\gamma}$	Shear rate
$\dot{\gamma}_0$	Reference shear rate
K	Estimated or actual information contained by a product
L	Distance between straight, parallel lines used to determine average grain size
λ	The contraction ratio for the strain tensor
M	Material class, (e.g., nickel, copper)
M_0	Selected alloy from material class
N	Number of laminae to be used in layer-by-layer creation of material
n	Inverse rate sensitivity parameter
n_c	Number of columns in the binned Fundamental Zone
n_h	Number of layers in the binned Fundamental Zone
n_r	Number of rows in the binned Fundamental Zone
ν	Poisson's ratio
P	Estimated power exerted to extract information contained by a product
$\phi_{1,i}$	Lamination orientation for the i-th layer
S	A measure of a product's ability to contain information
S_{11}	Material property constant obtained from literature for selected material class
S_{12}	Material property constant obtained from literature for selected material class
S_{44}	Material property constant obtained from literature for selected material class
$\overline{S}(wxyz)$	Sample compliance (average crystal compliance)
s	Slip systems. Comprised of slip plane normals, $\{111\}$, and slip directions $< 110 >$
σ'_{ij}	Deviatoric stress
σ_y	Yield strength
T	Estimated time to extract information K
t	Reference time frame for reverse engineering a product
τ	Reference time frame when all parameters are known

τ_0	Lattice friction stress
τ^*	Reference shear stress
Y_m	Fourier coefficients representing yield strength physics

Subscripts, superscripts, and other indicators

$[\,]^*$	indicates total measure or effective property
$[\,](t)$	indicates $[\,]$ is a function of time, in the t domain
$[\,](\tau)$	indicates $[\,]$ is a function of time, in the τ domain
$[\,]_0$	indicates $[\,]$ is evaluated at time t or τ equal to zero
$[\,]_p$	indicates $[\,]$ is in the part reference frame
$[\,]_c$	indicates $[\,]$ is in the crystal reference frame
$[\,]_l$	indicates $[\,]$ is in the lamina reference frame
$[\,]_t$	indicates $[\,]$ is the target value

CHAPTER 1. INTRODUCTION

This is an example of the introduction. It's pretty simple and shows off some of the basic commands.

1.1 First Section

This part shows how you can divide things into sections.

1.1.1 First Subsection

Also into subsections.

1.1.2 Second Subsection

Which really helps organization and automatically gets added to the Table of Contents and gets linked to by the hyperref package.

1.2 Citation Example

One of the greatest parts about LaTeX is BibTeX. You can just call the \cite command and it will organize the whole references section for you as long as there is an entry in the refs.bib file (or whichever other .bib file you tell it to use; see the source for master.tex). Here is an example of citing previous works [**?**, **?**].

1.3 Fixed Width Figure Example

This part also shows how to include a basic figure like the ones shown in Figures 1.1 and 1.2.

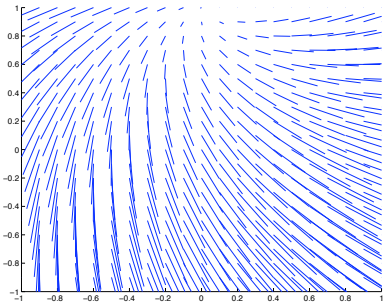

Figure 1.1: Example small width figure, showing how to use the width option.

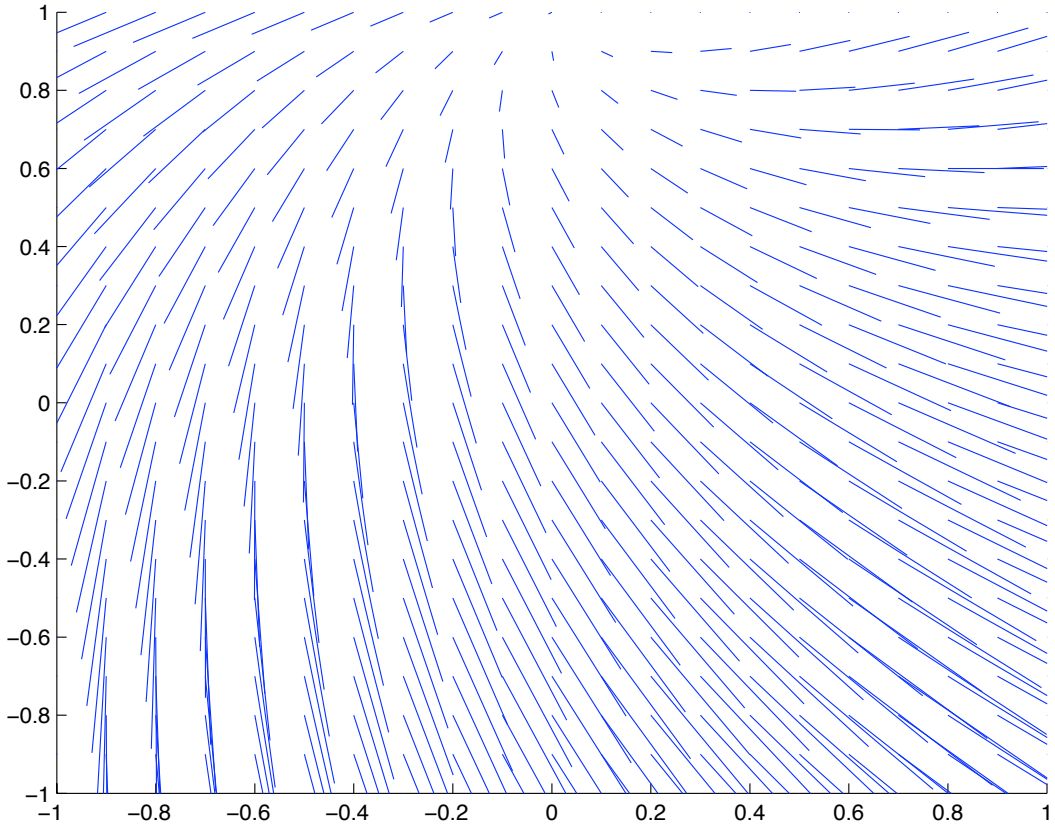

Figure 1.2: This figure is just a simple figure with a width set at 5.5 in. An example of a figure whose size depends on the width of the page is given in Figure A.1 in Section A.1 of Appendix A.

1.4 Math and Equation Example, Where the Heading Is Made so Long That It Extends onto a Second Line

Here is how to use inline math mode to define lambda like this, λ, and how to declare Equations (1.1) and (1.2)

$$I_x(x,y) = \frac{\partial I(x,y)}{\partial x}, \tag{1.1}$$

$$I_y(x,y) = \frac{\partial I(x,y)}{\partial y}. \tag{1.2}$$

Or you can create equation arrays like

$$\alpha = \beta^{\gamma} \tag{1.3}$$

$$x = \frac{1}{\alpha} \tag{1.4}$$

$$y = \sqrt{\left|\frac{\gamma}{\beta}\right|} \tag{1.5}$$

$$\zeta = x^{y}. \tag{1.6}$$

The lines in the array can be referenced by saying things like: In Eqn. (1.4) we show a wonderful equation, but it's not nearly as amazing as Eqn. (1.6).

CHAPTER 2. MAKING TABLES

2.1 Making a Table

An example LaTeX table is shown below in Table 2.1. You make a table by starting a table environment with a caption and label. You can specify the text that shows up in the Table of Contents using the optional parameter box, [], that's at the beginning of the \caption command. You tell the table how many columns in the beginning of the tabular environment using a command like this: | l | c | r |. That would create a table with 3 columns that are left-aligned, centered and right-aligned, in that order. The |'s tell LaTeX that you want bars separating the columns. Of course, you can also make tables without the | characters, in which case no lines will be added between the fields, which often looks better. You can also add horizontal lines using the \hline command. This example is also centered in the page using the \centering command.

Landscape tables can also be inserted, if desired, using the `sidewaystable` environment, which is defined in the `rotating` package. An example is found on the next page, in Table 2.2. Note that landscape tables and figures should be the exception rather than the rule, since they are more awkward to read. However, if you have an especially wide table or figure that cannot be reduced in size without losing required resolution, placing it in landscape may be a good idea.

Table 2.1: Description of the table, where the caption is long enough to go onto more than one line. The table caption should not extend beyond the edges of the table, and should make an "inverted pyramid."

Table Name	Column 2	Column 3	Column 4
First Row	4780286	72.941376	A
Second Row	4069335	62.093124	B
Third Row	4074900	62.178040	C
Fourth Row	4000000	60.000000	Z

Table 2.2: A landscape table

Year	Method of CVD Deposition	Thickness (μm)	Hardness (MPa)	Resistivity (Ω·m)
1999	LPCVD	5.1	175	2.3×10^{-5}
2000	PECVD	17.2	101	1.5×10^{-5}
2002	PECVD	4.3	55	3.4×10^{-5}
2004	LPCVD	1.1	225	5.1×10^{-5}

APPENDIX A. MAKING A FIGURE WITH WIDTH BASED ON PAGE SIZE

A.1 Width Based on Page Size Figure Example

Here's an example of a figure whose width depends on the width of the page. You can see it as Figure A.1. This also shows another citation [**?**].

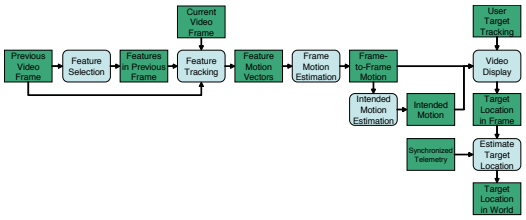

Figure A.1: This is an example of a figure whose width will be 45% of the width of the page. If you'd like to see a figure with a fixed width then you can see it as Figure 1.2 in Section 1.3 of Chapter 1.

APPENDIX B. FORMATTING GUIDELINES FOR THESIS

This appendix outlines the required formatting for theses and dissertations. While the LaTeX template takes care of most of these automatically, it is the student's responsibility to ensure that all formatting requirements are incorporated in the document.

B.1 Font

Times New Roman 12 pt. throughout text and 10 or 11 point for tables and figures.

B.2 Margins

- Preliminary Pages (Title page, Abstract page(s), Acknowledgment page, Table of Contents, List of Figures, List of Tables): 1 inch on all sides
- Body Pages, beginning with Introduction: 1 inch on all sides
- Chapter title pages, Appendix title page, Reference title page: 2 inches at top, 1 inch at bottom and sides

B.3 Printing

- Single-sided: Title page, Abstract page(s), Acknowledgment page
- Two-sided: Table of Contents, List of Figures, List of Tables, Body, Appendix, References

Note: Table of Contents, List of Figures, List of Tables, Chapter title pages, References and Appendix pages must begin on the front side of a page.

B.4 Page Numbering

- Page numbers are centered at the bottom of the page.

- Counting begins with the Title page; however, back pages are not counted until the Table of Contents.
- Page numbers do not appear on the page until the Table of Contents (v).
- Use Roman Numerals (v, vi, vii, ...) for the Table of Contents page and the pages thereafter until Chapter 1.
- Use Arabic numbers (1, 2, 3 ...) beginning with Chapter 1.
- Be sure numbers appear on all blank back pages once numbering begins.

B.5 Spacing

- Double-space text of body.
- Single-space abstract, captions, quotes, long chapter titles, headings, and subheadings.
- Table of Contents, List of Figures, List of Tables, and References can be single-spaced or double spaced.
- Double-space three times after chapter titles (48 pts).
- Double-space twice before subheadings (24 pts).
- Double-space once after subheadings (0 pts).
- Double-space once between two subheadings (0 pts).
- Double-space twice before and after figures (24 pts).
- Double-space twice before and after tables (24 pts).
- Double-space once before and after equations (0 pts).
- Do not leave a single line of text, a single-line equation, or a subheading alone on the top (widow) or bottom (orphan) of a page.
- Do not leave more than about 5 lines of white space remaining on a page unless its the end of a chapter.

B.6 Figures

- Figures are normally diagrams, graphs, maps, or charts.
- Center figures on the page.
- Center captions below the figure. If two lines are needed, the caption should be left justified at margin.
- A figure should be placed after the paragraph of reference. If it will not fit on the same page, continue the text and place the figure on the next page.

B.7 Tables

- Tables contain numerical or statistical information.
- Center tables on the page.
- Center captions above the table. If more than one line is needed, center the lines in an inverted pyramid:

Table 6.3 Comparison of roll rotation plots when node was displaced,
and an X-direction off-axis force was applied.

- If placed in the landscape position, the top of the table should be on the left side of the page, with the caption above the table. The page number is placed in the standard location.