

Thesis Title

by

First Middle Last

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science

Department of Example Department
University of Alberta

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Abstract

A thesis must have an abstract. The abstract comes after the title page and is marked page “ii”.

The abstract is a concise and accurate summary of the thesis. It states the problem that was researched, the methods of investigation, and the general conclusions. An abstract must not contain non-text content, such as tables, graphs, complex equations, or illustrations. Even for theses containing journal articles, there is one single abstract for the entire work, included within the preliminary pages (front pages) of the thesis.

For any thesis that is permitted to be written in a language other than English, two abstracts must be included; the first in English and the second in the language of the thesis.

The font used for the abstract must be at least a 10 point font, with the text double-spaced, to ensure readability. A strict maximum word count of 700 words applies, regardless of whether the abstract is for a master’s or a doctoral degree (many abstracts are 300–500 words).

For reference, this section is exactly one-hundred and seventy-six words.

Preface

If you need assistance on writing the preface, ask your supervisor. Your supervisor must review and verify the preface before it becomes part of the final version of the thesis.

A preface is a mandatory component of a thesis, regardless of thesis format, when a thesis contains journal articles authored or co-authored by the student (including an accepted paper that is forthcoming at the time of thesis submission). A preface is also a mandatory component when the research conducted for the thesis required ethics approval. A preface remains optional if there is no inclusion of journal articles and/or no need for ethics approval.

When required because a thesis contains journal articles, the preface serves as a place for the student to include a statement indicating his or her contribution to the journal articles, such as the identification and design of the research program, the performance of the various parts of the research (including the collection of data, construction of any necessary apparatus, and the performance of experiments), and the analysis of the research data. If any of the work presented in the thesis has led to any publications (accepted or published), these publications must be listed clearly in the preface with their bibliographical details and an indication as to where in the thesis this work is located (e.g. state in which chapter or chapters). For jointly authored publications, indication must also be given as to the relative contributions of the collaborators and co-authors, and a statement as to the proportion of research and writing conducted by the student. Note that permission may be needed if the co-authors hold the copyright in these publications. If ethics approval was required

for the research, a statement to this effect must be included in the preface with the details of the approval that was granted.

Note that the inclusion of a preface does not excuse a student from failing to acknowledge the contributions of others in the body of the thesis, as per the University's Research and Scholarship Integrity Policy and the Code of Student Behaviour. One would still expect to see footnotes, endnotes or in-text references within the thesis acknowledging the works. Acknowledgements, such as thanks to the supervisor and supervisory committee members, to colleagues, lab mates and friends, and to family, do not appear in the preface.

Examples of several prefaces are given in Appendix B and are also available from the FGSR website.

“Etiam ac leo a risus tristique nonummy. Donec dignissim tincidunt nulla. Vestibulum rhoncus molestie odio. Sed lobortis, justo et pretium lobortis, mauris turpis condimentum augue, nec ultricies nibh arcu pretium enim. Nunc purus neque, placerat id, imperdiet sed, pellentesque nec, nisl. Vestibulum imperdiet neque non sem accumsan laoreet. In hac habitasse platea dictumst. Etiam condimentum facilisis libero. Suspendisse in elit quis nisl aliquam dapibus. Pellentesque auctor sapien. Sed egestas sapien nec lectus. Pellentesque vel dui vel neque bibendum viverra. Aliquam porttitor nisl nec pede. Proin mattis libero vel turpis. Donec rutrum mauris et libero. Proin euismod porta felis. Nam lobortis, metus quis elementum commodo, nunc lectus elementum mauris, eget vulputate ligula tellus eu neque. Vivamus eu dolor.”

-Author of the Quote

To...

Acknowledgements

An Acknowledgements page (no more than 2 pages in length) is a recommended, but not mandatory, component of a thesis.

The Acknowledgements page serves as a place within a thesis where students may wish to acknowledge the provision of funding from third parties, such as an external scholarship bodies, research granting agencies, and foreign governments. It is also appropriate to recognize the assistance provided by the supervisor and members of the supervisory committee.

e.g. I would like to thank Daniel R. Aldrich for his continuing contributions to the University of Alberta, and for his work within the graduate student community. More specifically, I would like to acknowledge the work that he put into creating the L^AT_EX template that this thesis was created in, and the ongoing support that he provides to the students at the University of Alberta. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

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Chapter 1

Introduction

1.1 Background

As a graduate student from the University of Alberta, I understand the daunting task that is associated with writing a Thesis that conforms to the guidelines outlined in the FGSR Minimum Thesis Formatting Requirements. It can also be very frustrating to write long, equation and figure heavy, document in a word processor that is prone to crashes, file corruption, seemingly random changes to the formatting, and that do not output a document in the required PDF/A format for submission to FGSR.

Due to these problems, lots of students attempt to use an alternative to traditional word processors: \LaTeX .

\LaTeX allows students/researchers to focus on either the writing of the document or the formatting. Because the writing is separated from the formatting, the writing of the documents can be performed in much more lightweight text editors, or \TeX editors (that also allow for the compilation of the documents). These editors are usually able to save the work after every keystroke and due to the plaintext nature, are not generally susceptible to file corruption. \LaTeX has the added benefit of providing a consistent and professional look and feel throughout the document.

1.2 Objectives

The main objectives of this thesis are:

1. To provide a comprehensive guide on writing a thesis using L^AT_EX.
2. To assist students and researchers in mastering the nuances of L^AT_EX document preparation.
3. To showcase best practices for structuring and formatting a thesis in L^AT_EX.

1.3 Scope and Limitations

While there are existing templates for writing a thesis for the University of Alberta in L^AT_EX, there does not appear to be a template for L^AT_EX that provides students all the information required to write an outstanding thesis. This template/document aims to defeat this shortcoming by providing all the necessary information to create a well structured thesis, as well as providing examples to assist in the formatting of documents written in L^AT_EX. This thesis focuses on the following aspects:

- Installation and basic usage of L^AT_EX.
- Document structure and formatting.
- Inclusion of figures and tables.
- Handling mathematical equations.
- Citations and references using BibT_EX.
- Introduction to advanced topics and recommended packages.

However, it does not cover advanced L^AT_EX programming or extensive customization of document classes. Mainly because I did the heavy lifting for you; the class file, `ualberta.cls`, provides all the major document requirements while this document provides the references of how to include all the bits and bobs that one might want in a thesis.

1.4 Organization of the Thesis

The thesis is organized into several chapters, each addressing a specific aspect of writing a thesis in \LaTeX . The breakdown is as follows:

- **Chapter 2:** Getting Started with \LaTeX
- **Chapter 3:** Document Structure and Formatting
- **Chapter 4:** Figures and Tables
- **Chapter 5:** Mathematical Equations
- **Chapter 6:** Citations and References
- **Chapter 7:** Advanced Topics and Recommended Packages
- **Chapter 8:** Conclusion

Each chapter provides detailed information, examples, and recommendations to help the reader navigate the \LaTeX document preparation process effectively.

1.5 Summary

This chapter introduced the background, objectives, scope, and organization of the thesis. The subsequent chapters delve into specific topics, providing practical guidance and examples for mastering the art of writing a thesis in \LaTeX .

Chapter 2

Getting Started with L^AT_EX

2.1 Installation

To begin using L^AT_EX, you need to install a L^AT_EX distribution on your computer. Here are the steps for installing L^AT_EX on different platforms:

2.1.1 Windows

For Windows users, you can install [MiKTeX](#) or [TeX Live](#). Download the installer from the respective websites and follow the installation instructions.

2.1.2 Mac

On Mac, you can use [MacTeX](#) or [MiKTeX](#). Download the package from the respective websites and follow the installation instructions.

2.1.3 Linux

For Linux users, [TeX Live](#) is a common choice or one can use [MiKTeX](#). Use your package manager to install it, or download the installer from the respective websites.

2.2 Basic Document Structure

Once L^AT_EX is installed, you can create a basic L^AT_EX document. Here is a minimal example:

```

\documentclass{article}
\begin{document}
  \title{My First \LaTeX{} Document}
  \author{Your Name}
  \date{\today}

  \maketitle

  Hello , \LaTeX{}!
\end{document}

```

This example demonstrates a simple L^AT_EX document with a title, author, and date. The `\maketitle` command generates the title information.

2.3 Other Software Considerations

While by itself, L^AT_EX can be used with just a text editor and compiler, there are some additional software resources that will be very useful.

First of these softwares is a Reference Manager.

Note: *While a reference manager is suited for creating a thesis in L^AT_EX, it is not exclusive for use with L^AT_EX. In fact, even if you are writing your thesis in word I would recommend the use of one of the suggested reference managers to help keep track of all your references, and to keep track of the information you found within your references.*

Second of these (maybe should have been first or earlier in the document) is a different L^AT_EX editor. While all of the distributions above come with TeXWorks (a simple editor and compiler) you might find it more beneficial to have some additional features. For this I recommend one of the following:

- [TeXstudio](#)
- [Texmaker](#)
- [TeXnicCenter](#)
- [Overleaf](#) *See Note Below

I am sure there are others, but any of these will do you fine for writing your thesis.

Note: *Due to changes with Overleaf, I recommend it less and less. While it is convenient as it is web based, they have restricted it more and more forcing the users to now pay more for the software... including to get longer compile times. While this is not an issue for short articles, in longer documents, such as a thesis, this can be a large hinderance and cost (\$100CAD/year with student discount).*

Chapter 3

Document Structure and Formatting

A thesis for the University of Alberta can consist of many different parts that come together to create the final document. These will include the Title Page, Abstract, and other prefatory pages; and the chapters, sections, and subsections. In the following sections, we will look into how we can add these different sections and how to manipulate them too.

3.1 Title Page, Abstract, and Other Prefatory Pages

To create a title page in \LaTeX , you can use the `\maketitle` command after providing the necessary title, author, and date information. This is usually performed in the following way:

```
\title{Your Thesis Title}  
\author{Your Name}  
\date{\today}  
  
\begin{document}  
  \maketitle  
\end{document}
```

For a thesis at the University of Alberta, there are a few more pages that are required (Abstract and Preface) and some that are optional (Quote, Dedication, and Acknowledgements), but all of them have specific formatting requirements. To aid

you in the creation of these pages a few new macros have been provided.

- `\abstracttext`{Abstract Text goes here.}
- `\preface`{Preface Text goes here.}
- `\thesisquote`{Quote Text goes here.}
- `\dedication`{Dedication Text goes here}
- `\acknowledgementtext`{Acknowledgement Text goes here.}

3.1.1 Title Page

The thesis Title Page has a few more fields to be filled in than a regular \LaTeX document. These include `\degree`, `\specialization`, `\department`, `\faculty`, and `\convocationdate`. An example of how to fill these in can be seen in the original \LaTeX code (`ualberta.tex`) or in [Listing 3.1](#).

Most of the fields are fairly self explanatory, however, to be extra clear as to what needs to be included I will now provide an explanation of each field.:

Table 3.1: Title Page Macro Definitions and Examples

Field	Description	Example
<code>\title</code>	The Title of your Thesis.	The Perfect Thesis Title That is Perfectly Captivating
<code>\author</code>	Your Full Name.	Daniel Ryan Aldrich
<code>\degree</code>	Degree or one of the premade macros (note they are not case sensitive) <i>e.g.</i> , <code>\MSc</code> .	Master of Science or <code>\Msc</code>
<code>\specialization</code>	Specialization, otherwise, leave it blank.	Applied Math
<code>\department</code>	Department, or if you are non-departmentalized, leave this blank.	Mechanical Engineering
<code>\faculty</code>	If you are non-departmentalized, fill this in, otherwise, leave this blank.	
<code>\convocationdate</code>	The year in which you will convocate .	2024

Listing 3.1: Example of How to Set Title Page Info

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                               TITLE PAGE AND FRONTMATTER INFORMATION                               %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% TITLE PAGE INFO
\title{Thesis Title}           % Title of your Thesis
\author{First Middle Last}     % Your Full Name
\degree{\MSc}                  % \MSc, \PhD, \MA, \MEd, \MBA, \MAc, \MFM, \MN
                                % , \LLM, or \MMus
\specialization{}              % Leave blank if none
\department{Example Department} % Fill in the Department unless you are non-
                                % Departmental
\faculty{}                     % Leave blank unless non-Departmental
\convocationdate{2023}         % Convocation Year

```

3.2 Chapters, Sections, and Subsections

Organize your document hierarchically using chapters, sections, subsections, *ect.* These structures all utilize the base macros from L^AT_EX including:

- `\chapter{Chapter Heading}`,
- `\section{Section Heading}`,
- `\subsection{Subsection Heading}`,
- `\subsubsection{Sub-Subsection Heading}`,
- `\paragraph{Paragraph Heading}`,
- `\subparagraph{Subparagraph Heading}`.

💡 For writing your thesis, it is strongly recommended that one outlines the thesis using these commands first, while also added in a small description of what that chapter, section, *ect.*, should accomplish. This will help you stay organized and on track. Remembering that you can use comments, `%`, to hide these descriptions when you start to fill in your content.

3.3 Page Layout and Margins

⚠ WARNING While one can adjust the values using the commands provided by the following packages, unless you really know L^AT_EX inside and out this should be avoided. Everything provided in these files are aimed at making writing your thesis as easy as possible.

You can customize the layout and margins of your document using the `geometry` package. Additionally, you can use the `titlesec` package to customize the formatting of chapter and section titles.

Chapter 4

Figures, Tables, & Plates

4.1 Introduction

Figures and Tables play a crucial role in conveying information effectively in academic documents. This chapter will delve into the intricacies of incorporating figures and tables in your LaTeX document, exploring various features and advanced techniques to enhance the visual appeal and clarity of your content.

⚠ WARNING Throughout this Chapter there will be code listings that include lines that show the required packages. These lines should be included in your `\LaTeX`preamble, not in the body of your document. To make this easy I have actually included a document specifically to add your packages too. This can be found: `./00_LaTeX_Files/includePackages.tex`

💡 `./00_LaTeX_Files/includePackages.tex` includes all the packages required for creating all the examples in this document, some of these will not be necessary, however, I have included comments on all packages for what they are used for. This allows you to make a decision on if you will need them as well. If you are unsure, you may just comment out the line.

4.2 Inserting Figures

In `\LaTeX`, figures are included using the `graphicx` package. The `\includegraphics` command is used to insert an image. Let's consider an example:

Listing 4.1: A Basic Example of Including a Figure.

```
\usepackage{graphicx}

\begin{figure}[htb]
  \centering
  \includegraphics[width=0.7\linewidth]{example-image}
  \caption{Example Figure}
  \label{fig:example}
\end{figure}
```

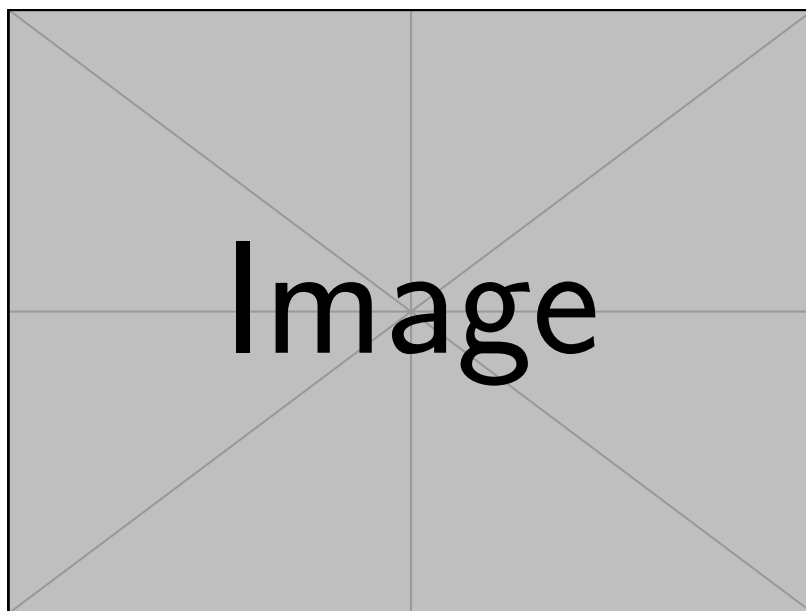


Figure 4.1: This is an example of a single figure similar to that produced by Listing 4.1.

In this example, the figure environment is used to contain the image. The `\centering` command ensures the image is centred horizontally. The width parameter is used to control the size of the image. The `\caption` and `\label` commands provide a caption and label for referencing, respectively.

Figures can be formatted to meet specific requirements. The `\subfigure` command from the subcaption package can be used for side-by-side figures:

This example uses the subfigure environment to create subfigures within a larger figure (as show in Figure 4.3. The `\hfill` command adds horizontal space between the subfigures.

```

\usepackage{subcaption}

\begin{figure}[htb]
  \begin{subfigure}{0.45\linewidth}
    \centering
    \includegraphics[width=\linewidth]{example-image-a}
    \caption{Subfigure A} % Leave blank for just letter
    \label{subfig:a}
  \end{subfigure}
  \hfill
  \begin{subfigure}{0.45\linewidth}
    \centering
    \includegraphics[width=\linewidth]{example-image-b}
    \caption{Subfigure B} % Leave blank for just letter
    \label{subfig:b}
  \end{subfigure}
  \caption{Example with Subfigures}
  \label{fig:subfigures}
\end{figure}

```

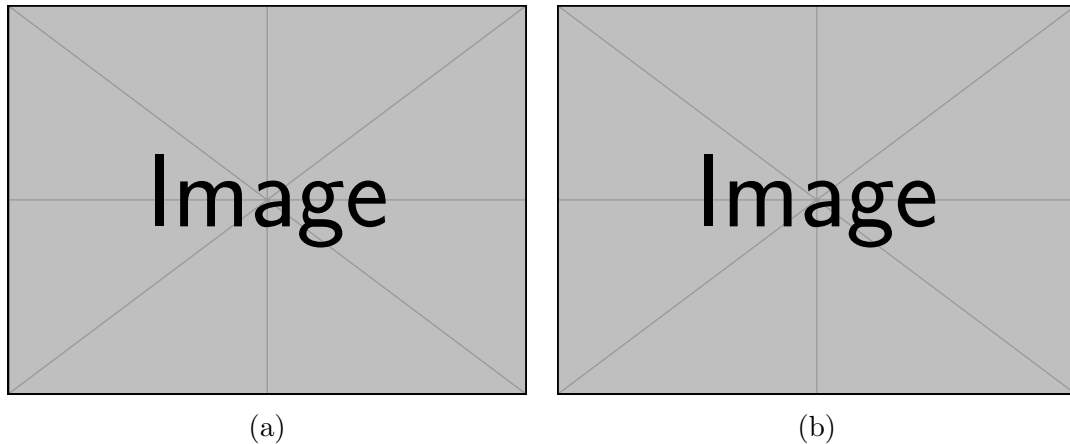


Figure 4.2: This is an example of a double image figure similar to that produced by [Section 4.2](#).

While this section provided a few examples on how to make some figures and subfigures, I would strongly recommend checking out the examples in "SEE APPEND-
 INX EXAMPE FIGURES". This will provide the code and examples for how to create more intricate subfigures.

4.3 Tables and Tabularx

Tables in \LaTeX are created using the tabular environment. The tabularx package is particularly useful when you want the table to automatically adjust its width. Let's define some custom column types for convenience:

```
\usepackage{tabularx}
\newcolumntype{C}{>{\centering\arraybackslash}X}
\newcolumntype{L}{>{\raggedright\arraybackslash}X}
\newcolumntype{R}{>{\raggedleft\arraybackslash}X}
Now, let's create a table using tabularx:

\begin{table}[htb]
\centering
\begin{tabularx}{\linewidth}{|C|L|R|}
\hline
\textbf{Centered} & \textbf{Left Justified} & \textbf{Right
    Justified} \\
\hline
Content & More content & Additional content \\
\hline
\end{tabularx}
\caption{Example Table with Tabularx}
\label{tab:example}
\end{table}
```

In this example, the tabularx environment is used, and the custom column types C, L, and R are applied to the columns. This ensures the content is centered, left-justified, and right-justified, respectively.

4.4 Advanced Table Features

To create professional-looking tables, the booktabs package can be employed. It provides commands for better spacing and styling of tables:

The `\toprule`, `\midrule`, and `\bottomrule` commands create horizontal rules with appropriate spacing.

```

\usepackage{booktabs}

\begin{table}[htb]
  \centering
  \begin{tabular}{ccc}
    \toprule
    \textbf{Header 1} & \textbf{Header 2} & \textbf{Header 3} \\
    \midrule
    Content 1 & Content 2 & Content 3 \\
    Content 4 & Content 5 & Content 6 \\
    \bottomrule
  \end{tabular}
  \caption{Example Table with Booktabs}
  \label{tab:booktabs_example}
\end{table}

```

4.5 Additional Packages for Enhanced Table Functionality

Several other packages can be employed to enhance table functionality:

The `longtable` package allows tables to span multiple pages, which is useful for large datasets. The `multirow` and `multicolumn` packages provide commands for cells that span multiple rows or columns, respectively. The `makecell` package enables more complex table layouts. Each of these packages comes with its set of commands and options. Let's briefly explore the usage of `longtable`, `multirow`, and `multicolumn`:

In these examples, the `longtable` environment is used for tables that span multiple pages. The `multirow` command is employed to create cells that span multiple rows, while `multicolumn` is used for cells that span multiple columns.

4.6 Conclusion

This chapter provided a comprehensive overview of including figures and tables in your \LaTeX document. From basic insertion of figures to advanced table formatting using packages like `tabularx`, `booktabs`, and others, you now have a solid foundation to include tables and figures in your thesis.

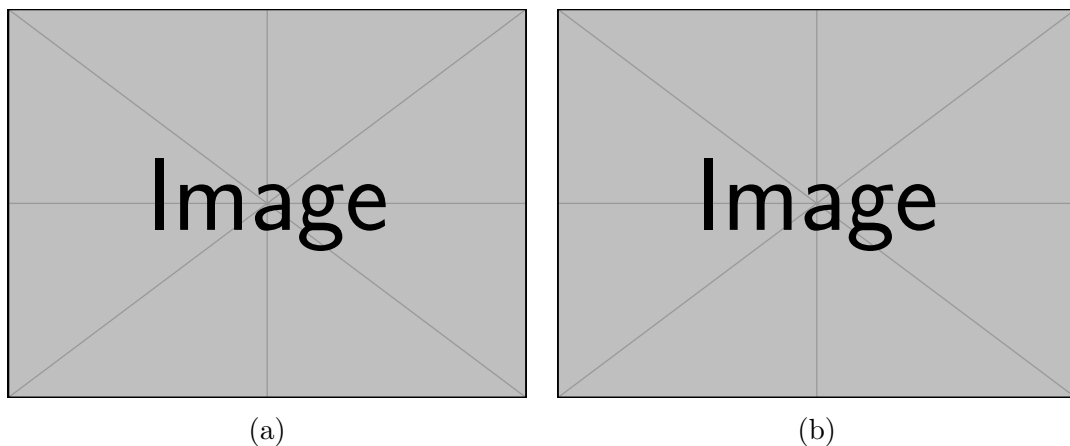


Figure 4.3: This is an example of a double image figure.

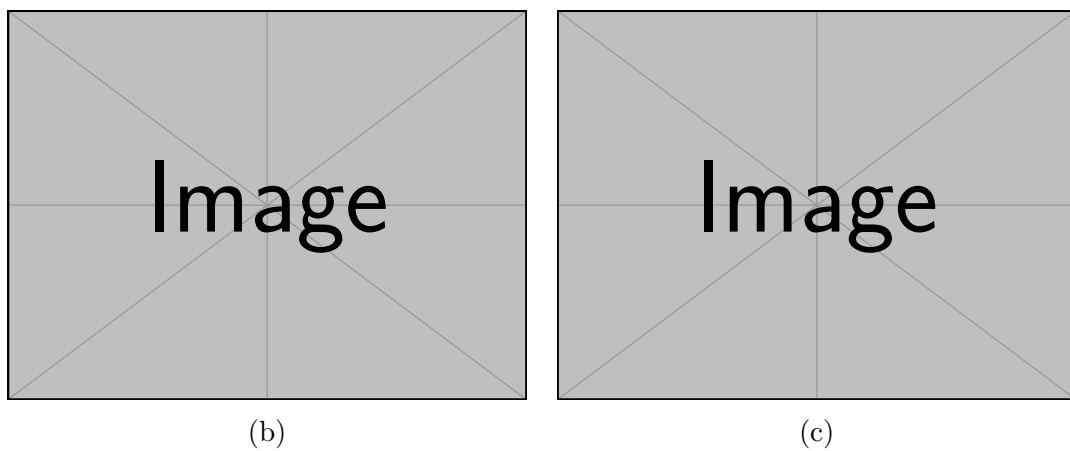
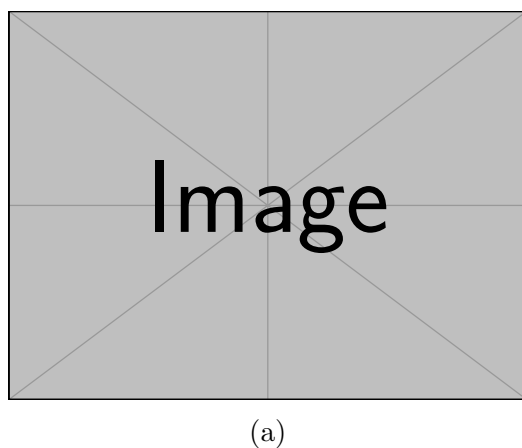
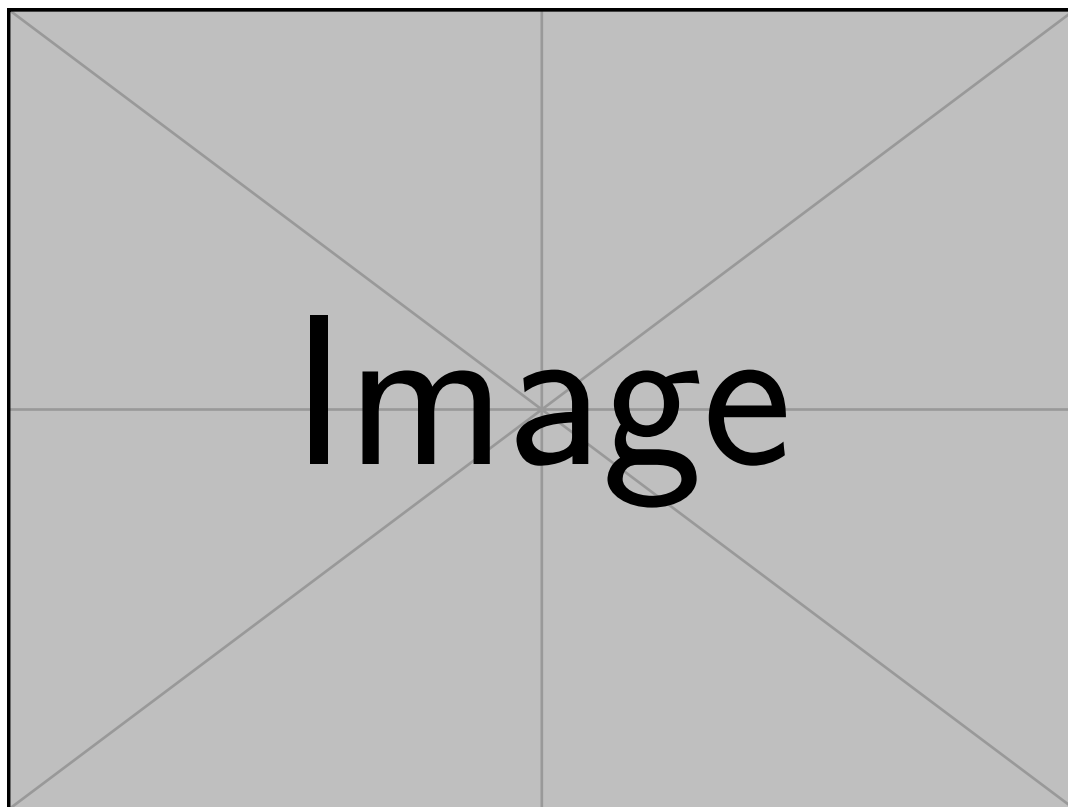
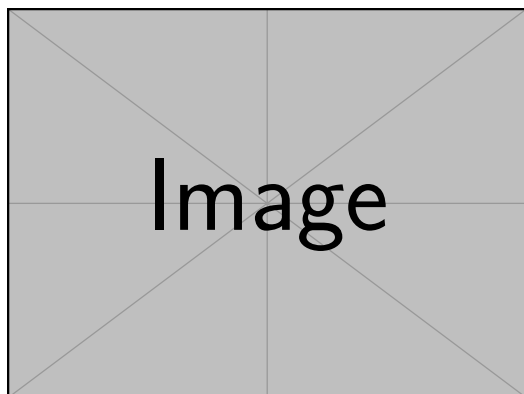


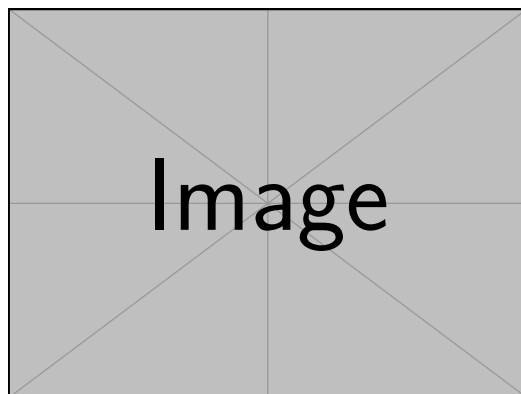
Figure 4.4: This is an example of a triple image figure.



(a)

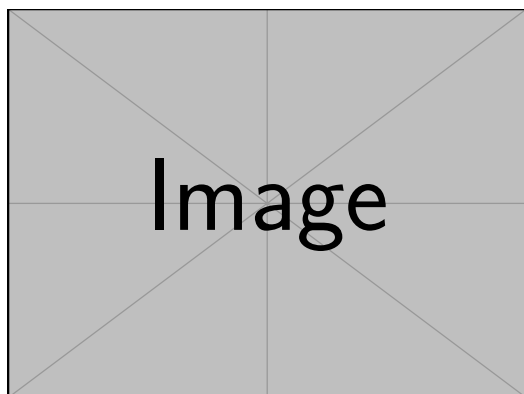


(b)

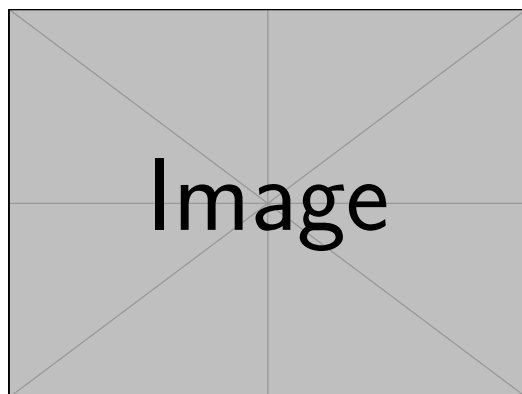


(c)

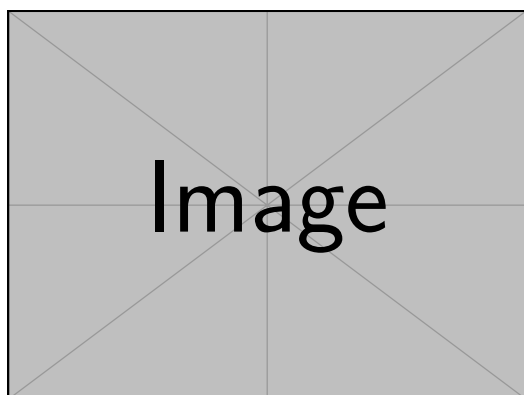
Figure 4.5: This is a second example of a triple image figure.



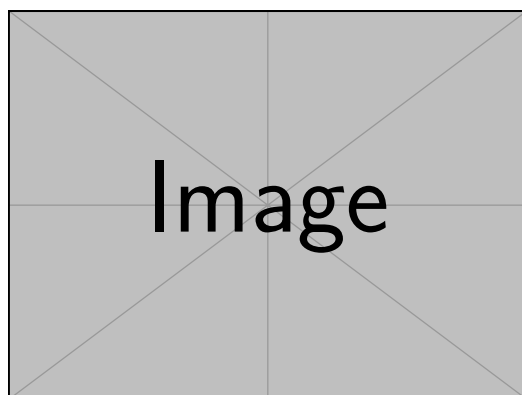
(a)



(b)



(c)



(d)

Figure 4.6: This is an example of a quad image figure.


```

\usepackage{longtable}
\usepackage{multirow}
\usepackage{multicolumn}

% Example Longtable
\begin{longtable}{|c|c|}
\caption{Longtable Example} \label{tab:longtable} \\
\hline
\textbf{Header 1} & \textbf{Header 2} \\
\hline
\endfirsthead
\hline
\textbf{Header 1} & \textbf{Header 2} \\
\hline
\endhead
Content 1 & Content 2 \\
Content 3 & Content 4 \\
\hline
\end{longtable}

% Example Multirow and Multicolumn
\begin{table}[htb]
\centering
\begin{tabular}{|c|c|c|}
\hline
\multirow{2}{*}{\textbf{Multirow-Col1}} & \multicolumn{2}{c}{\textbf{Multicolumn-Col2-3}} \\
\cline{2-3}
& \textbf{Column 2} & \textbf{Column 3} \\
\hline
Content 1 & Content 2 & Content 3 \\
\hline
\end{tabular}
\caption{Example Table with Multirow and Multicolumn}
\label{tab:multirow_multicolumn}
\end{table}

```

Chapter 5

Mathematical Equations

There are many ways to include formulas in your thesis. This section will provide some different ways of adding them (inline and standalone), as well as provide some ways of referencing the equations.

To start the simplest way to add an equation is using the built-in \LaTeX math mode. To enter and exit math mode one just needs to use the $\langle\text{Equation}\rangle$ symbols around an equation. While there also exists $\$ \langle\text{Equation}\rangle \$$ to add math, it is not recommended due to potential compatibility issues. Additionally, this, $\langle\text{Equation}\rangle$, method is capable of being redefined to add further customization. An example of using math mode to get an inline equation is by using the following command:

```
\(\vec{F}_d=\frac{1}{2} A C_d \vec{V}^2\)
```

The above command has the effect of creating the following output: $\vec{F}_d = \frac{1}{2} A C_d \vec{V}^2$. Sometimes it can be quite beneficial to separate what would be an inline equation to be on its own line. For this, we have two different ways of doing it. The first way will produce an equation that has no reference:

$$E = m c^2$$

$$E = m c^2$$

The second will produce an equation with a reference. For this, there are two main ways of creating the reference, the first one, see [Equation \(5.1\)](#), creates a numbered reference, the other one, see [Equation \(Constant pi\)](#), creates a reference with a ‘tag’. The difference between the two is just the inclusion of a `\tag{<text>}` command that will replace the regular number with `<text>`.

$$\pi = 3.1415... \tag{5.1}$$

$$\pi = 3.1415... \tag{Constant pi}$$

If you have multiple equations that you want arranged very neatly, use the align environment and you can assign individual equations numbers as shown in [Equations \(5.2\)](#) to [\(5.4\)](#). Note that it is the & symbol that determines what will be aligned. Further note that spaces in “math mode” are ignored and need to be specified using the space commands in

$$Equation1 = 1 \tag{5.2}$$

$$Equation2 = 2 + 2 \tag{5.3}$$

$$Equation3 = 3 + 3 + 3 \tag{5.4}$$

It may be very important in a math heavy thesis to be able to show your equations, or even data in a readable way. For this, we will explore some of the ways to create specific data.

5.1 Vector, Sets, Piecewise Functions, Matrix Math, and More

$$f(x) = \begin{cases} x^{2*\ln x}, & \text{if } x < 3 \\ -\frac{x}{2}, & \text{if } 3 \leq x \leq 4 \\ x, & \text{if } 4 < x \end{cases} \tag{5.5}$$

Vectors and Matrices are used in many fields of math and science and provide a

Table 5.1: Math Mode Greek Letters

Command	Output	Command	Output	Command	Output
<code>\alpha</code>	α	<code>\beta</code>	β	<code>\gamma</code>	γ
<code>\delta</code>	δ	<code>\epsilon</code>	ϵ	<code>\zeta</code>	ζ
<code>\eta</code>	η	<code>\theta</code>	θ	<code>\iota</code>	ι
<code>\kappa</code>	κ	<code>\lambda</code>	λ	<code>\mu</code>	μ
<code>\nu</code>	ν	<code>\xi</code>	ξ	<code>\omicron</code>	\omicron
<code>\pi</code>	π	<code>\rho</code>	ρ	<code>\sigma</code>	σ
<code>\tau</code>	τ	<code>\upsilon</code>	υ	<code>\phi</code>	ϕ
<code>\chi</code>	χ	<code>\psi</code>	ψ	<code>\omega</code>	ω
<code>A</code>	A	<code>B</code>	B	<code>\Gamma</code>	Γ
<code>\Delta</code>	Δ	<code>E</code>	E	<code>Z</code>	Z
<code>H</code>	H	<code>\Theta</code>	Θ	<code>I</code>	I
<code>K</code>	K	<code>\Lambda</code>	Λ	<code>M</code>	M
<code>N</code>	N	<code>\Xi</code>	Ξ	<code>O</code>	O
<code>\Pi</code>	Π	<code>P</code>	P	<code>\Sigma</code>	Σ
<code>T</code>	T	<code>\Upsilon</code>	Υ	<code>\Phi</code>	Φ
<code>X</code>	X	<code>\Psi</code>	Ψ	<code>\Omega</code>	Ω

convenient way to represent 2-Dimensional arrays of numbers.

$$x \in \{1, 2, 3, 4, 5, 6, 7\} \tag{5.6}$$

$$V_1 = \left(\begin{array}{cccc} a, & b, & c, & d \end{array} \right) \tag{5.7}$$

$$V_2 = \left(\begin{array}{c} a \\ b \\ c \\ d \end{array} \right) \tag{5.8}$$

$$M = \left[\begin{array}{cccc} a & b & c & d \\ e & f & g & h \\ i & j & k & l \\ m22n & o & p \end{array} \right] \tag{5.9}$$

Table 5.2: Blackboard Bold Letters

Command	Output	Command	Output	Command	Output
<code>\mathbb{A}</code>	A	<code>\mathbb{B}</code>	B	<code>\mathbb{C}</code>	C
<code>\mathbb{D}</code>	D	<code>\mathbb{E}</code>	E	<code>\mathbb{F}</code>	F
<code>\mathbb{G}</code>	G	<code>\mathbb{H}</code>	H	<code>\mathbb{I}</code>	I
<code>\mathbb{J}</code>	J	<code>\mathbb{K}</code>	K	<code>\mathbb{L}</code>	L
<code>\mathbb{M}</code>	M	<code>\mathbb{N}</code>	N	<code>\mathbb{O}</code>	O
<code>\mathbb{P}</code>	P	<code>\mathbb{Q}</code>	Q	<code>\mathbb{R}</code>	R
<code>\mathbb{S}</code>	S	<code>\mathbb{T}</code>	T	<code>\mathbb{U}</code>	U
<code>\mathbb{V}</code>	V	<code>\mathbb{W}</code>	W	<code>\mathbb{X}</code>	X
<code>\mathbb{Y}</code>	Y	<code>\mathbb{Z}</code>	Z		

Table 5.3: Calligraphic Letters

Command	Output	Command	Output	Command	Output
<code>\mathcal{A}</code>	\mathcal{A}	<code>\mathcal{B}</code>	\mathcal{B}	<code>\mathcal{C}</code>	\mathcal{C}
<code>\mathcal{D}</code>	\mathcal{D}	<code>\mathcal{E}</code>	\mathcal{E}	<code>\mathcal{F}</code>	\mathcal{F}
<code>\mathcal{G}</code>	\mathcal{G}	<code>\mathcal{H}</code>	\mathcal{H}	<code>\mathcal{I}</code>	\mathcal{I}
<code>\mathcal{J}</code>	\mathcal{J}	<code>\mathcal{K}</code>	\mathcal{K}	<code>\mathcal{L}</code>	\mathcal{L}
<code>\mathcal{M}</code>	\mathcal{M}	<code>\mathcal{N}</code>	\mathcal{N}	<code>\mathcal{O}</code>	\mathcal{O}
<code>\mathcal{P}</code>	\mathcal{P}	<code>\mathcal{Q}</code>	\mathcal{Q}	<code>\mathcal{R}</code>	\mathcal{R}
<code>\mathcal{S}</code>	\mathcal{S}	<code>\mathcal{T}</code>	\mathcal{T}	<code>\mathcal{U}</code>	\mathcal{U}
<code>\mathcal{V}</code>	\mathcal{V}	<code>\mathcal{W}</code>	\mathcal{W}	<code>\mathcal{X}</code>	\mathcal{X}
<code>\mathcal{Y}</code>	\mathcal{Y}	<code>\mathcal{Z}</code>	\mathcal{Z}		

Table 5.4: Fraktur Letters

Command	Output	Command	Output	Command	Output
<code>\mathfrak{A}</code>	\mathfrak{A}	<code>\mathfrak{B}</code>	\mathfrak{B}	<code>\mathfrak{C}</code>	\mathfrak{C}
<code>\mathfrak{D}</code>	\mathfrak{D}	<code>\mathfrak{E}</code>	\mathfrak{E}	<code>\mathfrak{F}</code>	\mathfrak{F}
<code>\mathfrak{G}</code>	\mathfrak{G}	<code>\mathfrak{H}</code>	\mathfrak{H}	<code>\mathfrak{I}</code>	\mathfrak{I}
<code>\mathfrak{J}</code>	\mathfrak{J}	<code>\mathfrak{K}</code>	\mathfrak{K}	<code>\mathfrak{L}</code>	\mathfrak{L}
<code>\mathfrak{M}</code>	\mathfrak{M}	<code>\mathfrak{N}</code>	\mathfrak{N}	<code>\mathfrak{O}</code>	\mathfrak{O}
<code>\mathfrak{P}</code>	\mathfrak{P}	<code>\mathfrak{Q}</code>	\mathfrak{Q}	<code>\mathfrak{R}</code>	\mathfrak{R}
<code>\mathfrak{S}</code>	\mathfrak{S}	<code>\mathfrak{T}</code>	\mathfrak{T}	<code>\mathfrak{U}</code>	\mathfrak{U}
<code>\mathfrak{V}</code>	\mathfrak{V}	<code>\mathfrak{W}</code>	\mathfrak{W}	<code>\mathfrak{X}</code>	\mathfrak{X}
<code>\mathfrak{Y}</code>	\mathfrak{Y}	<code>\mathfrak{Z}</code>	\mathfrak{Z}		

Chapter 6

Citations/References, and Cross-References

This section will be showing off some of the different ways to include “citations” and “cross-references” within your document. Note that **cross-references** in \LaTeX utilize `\ref{}` as a command, while one might think that this is short for reference this is not the case citation/references utilize the `\cite{}` commands.

6.1 Cross-References

In \LaTeX , references will “reference” a `\label{Reference:Label}` command. This section has the following command to define the chapter:

```
\chapter{Citations/References, and Cross-References}\label{ch:citref}
```

By using `\ref{ch:citref}`, this allows you to insert a reference that look like this: 6. Now this by itself is not the most useful, to make it a bit better we should keep track of what we are referencing, in this case a **Chapter**, and add this label in front of the reference (`Chapter~\ref{sec:citref}`) and this will display like this: Chapter 6. Note to ensure the reference is not split we add a non-breaking space (~) to prevent \LaTeX from accidentally adding a linebreak.

While using the `ref` command, you might ask “*Why does \LaTeX not just know what it is that I am referencing and insert that automatically in front of the reference?*”

The answer is to provide more flexibility to the user. However, that being said, individuals have created a number of packages that work to enhance the workflow of adding these cross-references. Some of these are provided by the **hyperref** and **cleveref** packages. To include these packages add the following lines to the **bottom** of your preamble (order matters, cleveref needs to be after hyperref and hyperref should be one of the last packages loaded):

```
\usepackage{hyperref}
\usepackage[nameinlink]{cleveref}
```

With these packages loaded we can now use the commands listed in Table 6.2.¹

Table 6.1: Built-in, hyperref, and cleveref commands and outputs

Command	Output
built-in	
<code>\ref{}</code>	6.2
<code>\pageref{}</code>	29
hyperref	
<code>\autoref{}</code>	Table 6.2
cleveref	
<code>\cref{}</code>	table 6.2
<code>\Cref{}</code>	Table 6.2
<code>\cref*{}</code>	table 6.2
<code>\Cref*{}</code>	Table 6.2
<code>\cpageref{}</code>	page 29
<code>\Cpageref{}</code>	Page 29
<code>\namecref{}</code>	table
<code>\nameCref{}</code>	Table

Further, the **cleveref** also includes features that allows for the auto sorting and

¹Note that because the floats are added where they are in the text this causes them to insert large amounts of white space because it only fits on the following page.

combining of references:

```
\Cref{fig:doubleImage,fig:singleImage,fig:tripleImage1,
      fig:quadImage}
```

Noting that there are **NO** spaces between the labels; this will produce: **Figures 4.1, 4.3, 4.4 and 4.6**. Allowing one to quickly and efficiently keep references up-to-date and consistent in their style. More examples of the use of the **cleveref** cross-referencing is found through the rest of this ??.

6.2 Citations/References

6.3 Citation Managers

6.3.1 JabRef

This section will be showing off some of the different ways to include “citations” and “cross-references” within your document. Note that **cross-references** in \LaTeX utilize `\ref{}` as a command, while one might think that this is short for reference this is not the case citation/references utilize the `\cite{}` commands.

6.3.2 Cross-References

In \LaTeX , references will “reference” a `\label{Reference:Label}` command. This section has the following command to define the the section:

```
\section{Citations and References}\label{sec:citref}
```

By using `\ref{sec:citref}`, this allows you to insert a reference that look like this: ??. Now this by itself is not the most useful, to make it a bit better we should keep track of what we are referencing, in this case a **Section**, and add this label in front of the reference (`Section~\ref{sec:citref}`) and this will display like this: Section ??. Note to ensure the reference is not split we add a non-breaking space (~) to prevent \LaTeX from adding a linebreak.

While using the `ref` command, you might ask “*Why does \LaTeX not just know what it is that I am referencing and insert that automatically in front of the reference?*” The answer is to provide more flexibility to the user. However, that being said, individuals have created a number of packages that work to enhance the workflow of adding these cross-references. Some of these are provided by the **hyperref** and **cleveref** packages. To include these packages add the following lines to the bottom of your preamble (order matters, `cleveref` needs to be after `hyperref` and `hyperref` should be one of the last packages loaded):

```
\usepackage{hyperref}
\usepackage[nameinlink]{cleveref}
```

With these packages installed we can now use the commands in [Table 6.2](#).²

²Note that because the floats are added where they are in the text this causes them to insert large amounts of white space because it only fits on the following page.

Table 6.2: Built-in, hyperref, and cleveref commands and outputs

Command	Output
built-in	
<code>\ref{}</code>	6.2
<code>\pageref{}</code>	29
hyperref	
<code>\autoref{}</code>	Table 6.2
cleveref	
<code>\cref{}</code>	table 6.2
<code>\Cref{}</code>	Table 6.2
<code>\cref*{}</code>	table 6.2
<code>\Cref*{}</code>	Table 6.2
<code>\cpageref{}</code>	page 29
<code>\Cpageref{}</code>	Page 29
<code>\namecref{}</code>	table
<code>\nameCref{}</code>	Table

Further, the **cleveref** also includes features that allows for the auto sorting and combining of references:

```
\Cref{fig:doubleImage,fig:singleImage,fig:tripleImage
1,fig:quadImage}
```

Noting that there are **NO** spaces between the labels; this will produce: **Figures 4.1, 4.3, 4.4 and 4.6**. Allowing one to quickly and efficiently keep references up-to-date and consistent in their style. More examples of the use of the **cleveref** cross-referencing is found through the rest of this ??.

6.3.3 Citations

Citations are a lot easier than dealing with the cross-referencing. There are no additional packages required for citations, the built-in ones are feature-rich enough. Now, while there are no additional packages required to make citations in your document, there are in fact a few programs that should help you manage all of your citations/references. These programs can include Mendeley, JabRef, or Zotero; a comparison of the softwares can be found in [Table 6.3](#), and more information of the use of JabRef can be found in [Chapter 8](#). Single citations can be included with the

Table 6.3: Comparison of Reference Softwares

Software	Developer	Version	Cost	License
JabRef	The JabRef Team	5.11	Free	MIT
Mendeley	Elsevier	2.99.0	Free up to 2 GB	Proprietary
Zotero	CDS	6.0.27	Free up to 300 MB	AGPL

`\cite{citationKey}` command, the one at the end of this sentence is created with the `\cite{TEST}` command[1]. Multiple citations can be included in a single cite command by adding commas in between the citation keys. The citation at the end of this sentence shows how to create more than one citation and how they are grouped together, it is created with the `\cite{testone,cite2,cite3,cite4,cite5}` command[2–6]. Finally this sentence shows how a gap in the citations is handled, this is created with the `\cite{testone,cite2,cite3,cite5}` command[2–4, 6].

Chapter 7

Advanced Topics And Packages

Chapter 8

JabRef: Managing Bibliographies Efficiently

8.1 Introduction

JabRef stands as a powerful tool for researchers and academics engaged in scholarly writing. JabRef offers a robust solution for bibliography management, including a number of features to ensure that you are not only able to organize your references but keep track of progress, and notes on each reference. This chapter aims to provide an review of JabRef, including its myriad features that I find particularly useful, and to guide you through its implementation in writing your thesis.

8.2 Key Features of JabRef

JabRef, with its versatile features, emerges as an indispensable tool for bibliography/reference management. Delving deeper into its functionalities reveals a wealth of tools designed to streamline the often cumbersome process of handling references.

8.2.1 BibTeX Compatibility

JabRef's commitment to the BibTeX format is a testament to its roots in the L^AT_EX ecosystem. This compatibility ensures a seamless integration between the reference management process and the L^AT_EX document preparation workflow. Users can easily export and import BibTeX files, facilitating collaboration and compatibility across

various platforms.

8.2.2 Reference Import

The capability to import references directly from online databases and journal websites significantly accelerates the reference collection process. JabRef supports various import formats, allowing users to effortlessly populate their databases with accurate and structured reference information. This feature is particularly valuable for researchers dealing with large/extensive bibliographies.

8.2.3 Customizable Entry Types

The flexibility offered by customizable entry types allows users to categorize references based on the nature of the source. Whether it's a book, article, conference proceeding, or any other reference type, JabRef accommodates diverse sources, ensuring a well-organized and easily navigable bibliography.

8.2.4 Search and Filter

The ability to efficiently search and filter references is a hallmark of JabRef's usability. Researchers dealing with extensive databases will appreciate the quick and precise retrieval of references based on author names, titles, keywords, or any other criteria. This feature is crucial for maintaining order in a rapidly growing bibliography.

8.2.5 Grouping

JabRef's grouping functionality provides a systematic approach to organizing references. Users can create custom groups to categorize references based on themes, projects, or any other criteria. This feature is especially useful for large research projects where a systematic organization of references is essential for maintaining clarity and coherence.

8.2.6 Integration with L^AT_EX

The seamless integration of JabRef with L^AT_EX editors fortifies the synergy between bibliography management and document preparation. This integration minimizes the manual effort required for citation insertion and ensures consistency between the bibliography and the in-text citations. Users can easily copy citation keys from JabRef and paste them directly into their L^AT_EX documents.

8.3 Getting Started with JabRef

Now that we’ve outlined the key features of JabRef, let’s embark on a comprehensive guide on how to get started with JabRef. This step-by-step walkthrough will cover everything from installation to creating a new bibliography and populating it with references.

8.3.1 Installation

The initial step in utilizing JabRef is to install the software on your system. For all users, regardless of OS, the easiest way to download JabRef is to visit their website: <https://www.jabref.org/>. Once there select ‘Download’ from the navigation bar, and press the “Download JabRef” button. This will take you to the FossHub page where you can select the appropriate version for your OS and download and install it.

8.3.2 Creating a New Bibliography

Once JabRef is successfully installed, launch the application. When the program loads you will be faced with a window that looks like the one shown in **Figure 8.1**.

Now that the program is open, to create a new bibliography:

1. Click on ‘File → New Library’.

To save the database:

1. Click on ‘File → Save Library’.

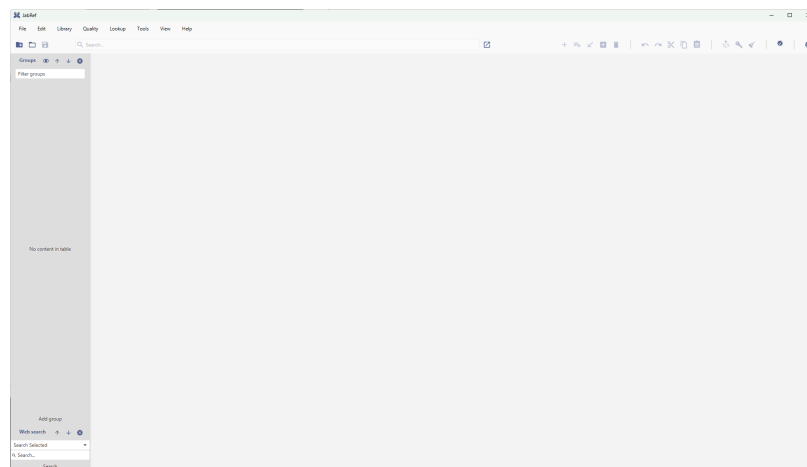


Figure 8.1: JabRef Main Window.

2. Choose an appropriate and location.
3. Click ‘Save’.

Congratulations! You’ve initiated your bibliography using JabRef. Now that we have this created, the next step is to add references to the database.

8.3.3 Adding References

JabRef offers multiple avenues for adding references to your database. Some of the methods are generally more useful than others but we will go over a few that you are likely to use:

Web Search

JabRef’s integrated web search (see [Figure 8.3](#)) feature simplifies the process of importing references from online sources. This is by-far the easiest way to enter a reference.

1. Click on ‘Web Search’.
2. Search for the desired reference using the integrated search feature.
3. Select the reference all the references you wish to import.

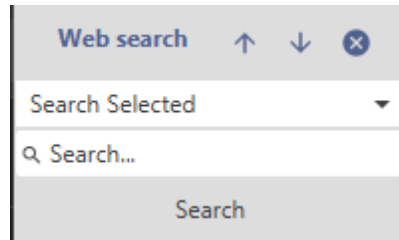


Figure 8.2: JabRef Web Search Tool.

4. Click ‘Import entries’ to import the selected entries.
5. The references are added to your library.

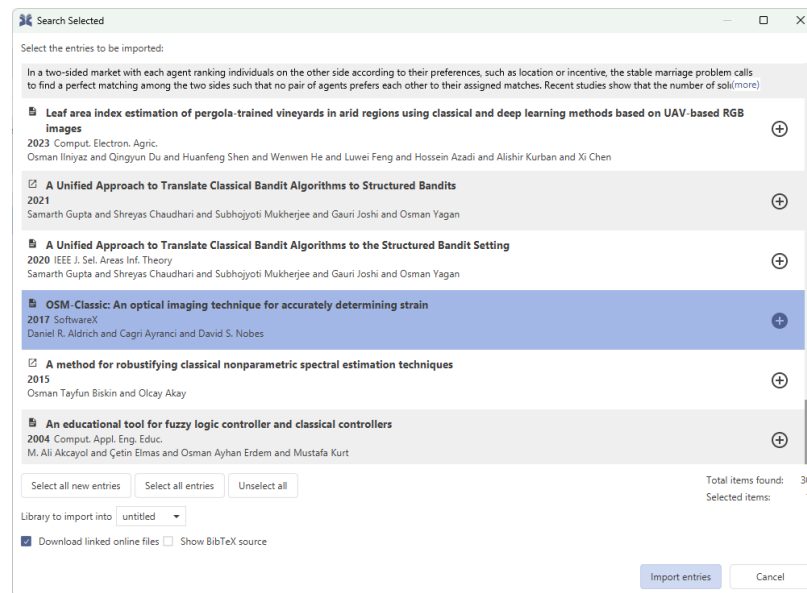


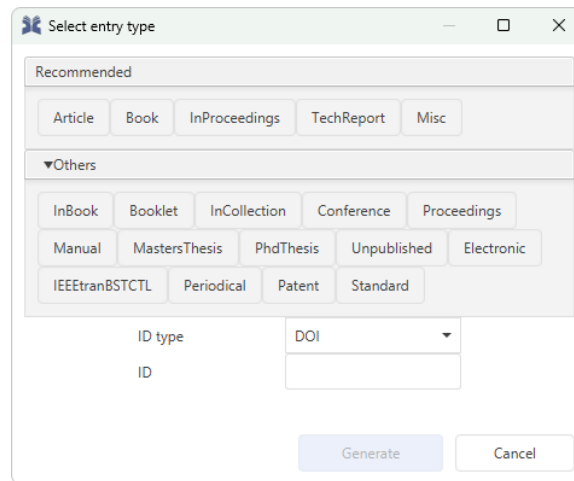
Figure 8.3: Example Web Search Results for ‘‘OSM-Classic’’.

Note: The Web Search tool by default uses a general search, however, a specific database can be chosen as well using the drop down arrow next to “Search Selected”.

Manual Entry

Manually adding a reference can be done in a ‘manual’ and ‘automatic’ way. When adding a new entry you will be faced with the option to select an entry type or to enter an ID (DOI, ArXiv, ISBN, *etc.*). If you enter an ID, the information for the reference will be automatically pulled from the internet. Otherwise to manually enter all the information for a reference:

1. Click Library → ‘New entry’ or use the shortcut ‘Ctrl + N’ and this will show the following window.



2. Choose the entry type (*e.g.*, article, book, inproceedings).
3. Fill in the required fields like author, title, journal, *etc.*

By following these steps, you can efficiently populate your JabRef database with the necessary references.

8.3.4 Organizing References

Effectively organizing references is essential for a streamlined bibliography. JabRef’s grouping feature allows you to categorize references based on your preferences:

1. On the left panel, select ‘Add Group’.
2. Give the group an appropriate name.
3. Optionally you can add a Description, Icon, Colour, *etc.*

To assign a reference to a group:

1. Select the Reference(s) from the center list.
2. Drag them to the group on the left of the screen.

Note: *Groups can even be nested into groups to provide more levels of organization.* Organizing references into groups enhances accessibility and facilitates a more systematic approach to bibliography management.

8.4 Exploring Advanced Features of JabRef

JabRef’s capabilities extend beyond the basics covered in the previous sections. In this section, we’ll explore some of the advanced features that enhance the efficiency and effectiveness of JabRef as a reference manager.

8.4.1 Quality Assurance: Checking and Correcting Entries

Ensuring the accuracy and completeness of references is crucial. JabRef provides tools for quality assurance, allowing users to check and correct entries.

To check for duplicate entries:

1. Click on ‘Quality → Find duplicates’.
2. JabRef will identify and display duplicate entries.

To correct entries:

1. Click on ‘Quality → Cleanup entries’.
2. JabRef will provide some useful option to ensure conformity within the different references. This includes renaming Linked PDFs to match the standard of ‘‘CitationKey - Title’’.

These quality assurance features contribute to maintaining a clean and error-free bibliography.

8.4.2 Managing PDFs and File Links

JabRef facilitates the management of associated PDFs and file links, offering a consolidated approach to reference and document management.

To link a PDF or file:

1. Open the entry editor for a reference.
2. Click on ‘General’ and use the ‘PDF’ or ‘File’ field to link the document.

This integration streamlines the retrieval of associated documents directly from JabRef. Further, this allows JabRef to keep track of the comments and highlights in a single place (see **Figure 8.4**). These annotations can be found by selecting the entry, and selecting the ‘File annotations’ tab.

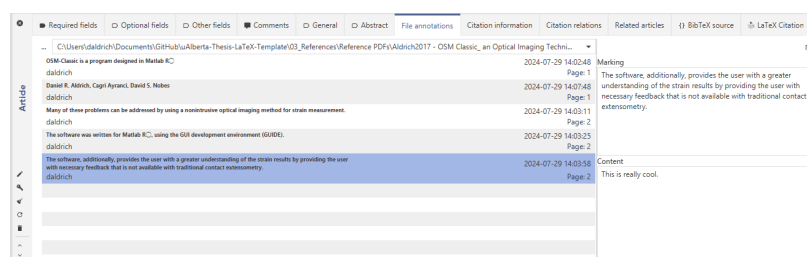


Figure 8.4: JabRef Web Search Tool.

8.4.3 Additional Information

JabRef keeps track of a lot of information and can even help you with your research. Some additional information JabRef provides includes:

- Citation information
- Citation relationships (what the reference cites and who has cited the reference).
This further lets you open the links to the reference’s source, or even add these references directly to your library.
- If one right clicks an entry you are provided the following options:
 - Rank - rank the reference with one to five stars.
 - Toggle Relevance - add a marker to show this is a relevant source.
 - Priority - rank items as low, medium, or high priority.

- Read Status - set the status to read or skimmed.

Bibliography

- [1] A. Thor, “Cited article,” *Journal Name*, 2020.
- [2] A. one, “Article 1,” *Journal 1*, 1989.
- [3] A. two, “Article 2,” *Journal 2*, 1900.
- [4] A. three, “Article 3,” *Journal 3*, 1990.
- [5] A. four, “Article 4,” *Journal 4*, 1990.
- [6] A. five, “Article five,” *Journal five*, 1990.

Appendix A: First Appendix

A.1 Section 1

Nullam eleifend justo in nisl. In hac habitasse platea dictumst. Morbi nonummy. Aliquam ut felis. In velit leo, dictum vitae, posuere id, vulputate nec, ante. Maecenas vitae pede nec dui dignissim suscipit. Morbi magna. Vestibulum id purus eget velit laoreet laoreet. Praesent sed leo vel nibh convallis blandit. Ut rutrum. Donec nibh. Donec interdum. Fusce sed pede sit amet elit rhoncus ultrices. Nullam at enim vitae pede vehicula iaculis.

Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Aenean nonummy turpis id odio. Integer euismod imperdiet turpis. Ut nec leo nec diam imperdiet lacinia. Etiam eget lacus eget mi ultricies posuere. In placerat tristique tortor. Sed porta vestibulum metus. Nulla iaculis sollicitudin pede. Fusce luctus tellus in dolor. Curabitur auctor velit a sem. Morbi sapien. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Donec adipiscing urna vehicula nunc. Sed ornare leo in leo. In rhoncus leo ut dui. Aenean dolor quam, volutpat nec, fringilla id, consectetur vel, pede.

Nulla malesuada risus ut urna. Aenean pretium velit sit amet metus. Duis iaculis. In hac habitasse platea dictumst. Nullam molestie turpis eget nisl. Duis a massa id pede dapibus ultricies. Sed eu leo. In at mauris sit amet tortor bibendum varius. Phasellus justo risus, posuere in, sagittis ac, varius vel, tortor. Quisque id enim. Phasellus consequat, libero pretium nonummy fringilla, tortor lacus vestibulum nunc, ut rhoncus ligula neque id justo. Nullam accumsan euismod nunc. Proin vitae ipsum

ac metus dictum tempus. Nam ut wisi. Quisque tortor felis, interdum ac, sodales a, semper a, sem. Curabitur in velit sit amet dui tristique sodales. Vivamus mauris pede, lacinia eget, pellentesque quis, scelerisque eu, est. Aliquam risus. Quisque bibendum pede eu dolor.

A.2 Section 2

Fusce suscipit cursus sem. Vivamus risus mi, egestas ac, imperdiet varius, faucibus quis, leo. Aenean tincidunt. Donec suscipit. Cras id justo quis nibh scelerisque dignissim. Aliquam sagittis elementum dolor. Aenean consectetur justo in pede. Curabitur ullamcorper ligula nec orci. Aliquam purus turpis, aliquam id, ornare vitae, porttitor non, wisi. Maecenas luctus porta lorem. Donec vitae ligula eu ante pretium varius. Proin tortor metus, convallis et, hendrerit non, scelerisque in, urna. Cras quis libero eu ligula bibendum tempor. Vivamus tellus quam, malesuada eu, tempus sed, tempor sed, velit. Donec lacinia auctor libero.

Appendix B: Second Appendix

B.1 Section 1

Nullam eleifend justo in nisl. In hac habitasse platea dictumst. Morbi nonummy. Aliquam ut felis. In velit leo, dictum vitae, posuere id, vulputate nec, ante. Maecenas vitae pede nec dui dignissim suscipit. Morbi magna. Vestibulum id purus eget velit laoreet laoreet. Praesent sed leo vel nibh convallis blandit. Ut rutrum. Donec nibh. Donec interdum. Fusce sed pede sit amet elit rhoncus ultrices. Nullam at enim vitae pede vehicula iaculis.

Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Aenean nonummy turpis id odio. Integer euismod imperdiet turpis. Ut nec leo nec diam imperdiet lacinia. Etiam eget lacus eget mi ultricies posuere. In placerat tristique tortor. Sed porta vestibulum metus. Nulla iaculis sollicitudin pede. Fusce luctus tellus in dolor. Curabitur auctor velit a sem. Morbi sapien. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Donec adipiscing urna vehicula nunc. Sed ornare leo in leo. In rhoncus leo ut dui. Aenean dolor quam, volutpat nec, fringilla id, consectetur vel, pede.

Nulla malesuada risus ut urna. Aenean pretium velit sit amet metus. Duis iaculis. In hac habitasse platea dictumst. Nullam molestie turpis eget nisl. Duis a massa id pede dapibus ultricies. Sed eu leo. In at mauris sit amet tortor bibendum varius. Phasellus justo risus, posuere in, sagittis ac, varius vel, tortor. Quisque id enim. Phasellus consequat, libero pretium nonummy fringilla, tortor lacus vestibulum nunc, ut rhoncus ligula neque id justo. Nullam accumsan euismod nunc. Proin vitae ipsum

ac metus dictum tempus. Nam ut wisi. Quisque tortor felis, interdum ac, sodales a, semper a, sem. Curabitur in velit sit amet dui tristique sodales. Vivamus mauris pede, lacinia eget, pellentesque quis, scelerisque eu, est. Aliquam risus. Quisque bibendum pede eu dolor.

B.2 Section 2

Fusce suscipit cursus sem. Vivamus risus mi, egestas ac, imperdiet varius, faucibus quis, leo. Aenean tincidunt. Donec suscipit. Cras id justo quis nibh scelerisque dignissim. Aliquam sagittis elementum dolor. Aenean consectetur justo in pede. Curabitur ullamcorper ligula nec orci. Aliquam purus turpis, aliquam id, ornare vitae, porttitor non, wisi. Maecenas luctus porta lorem. Donec vitae ligula eu ante pretium varius. Proin tortor metus, convallis et, hendrerit non, scelerisque in, urna. Cras quis libero eu ligula bibendum tempor. Vivamus tellus quam, malesuada eu, tempus sed, tempor sed, velit. Donec lacinia auctor libero.

Appendix C: Third Appendix

C.1 Section 1

Listing C.1: This is a caption for the inserted code

```
function [outputs] = functionName(inputs)
    %{
        This is a Comment Block
        That
        can
        span
        multiple
        lines.
    %}

    % This is a regular comment
    a = 1 + 2 * sin(angle);
    b = 'This is a String';
```

C.2 Section 2

Listing C.2: This is a caption for the inserted code

```
#include <iostream>
using namespace std;
/* This function adds two integer values
 * and returns the result
 */
int
sum(int num1, int num2){
    int num3 = num1 + num2; return num3;
}

int main(){
    //Calling the function
    cout << 'The sum is:' << sum(1,99);
    return 0;
}
```

Appendix D: Inserting PDFs

D.1 how to insert a portrait PDF

This is an Example PDF that is Portrait

This is the second page

D.2 How to insert a landscape PDF

This is an Example PDF that is Landscape

This is the second page