LaTeX Thesis Template
of
The University of Waterloo

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Doctor of Philosophy
in
Mechanical Engineering

Waterloo, Ontario, Canada, 2016

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This is a short brochure on how to write your thesis by using this LaTeX template. It's easy, efficient and straightforward. What you need to do, no matter you are familiar with LaTeX or not, is to have a try.

Acknowledgements

Dedication (included if necessary)

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Nomenclature

Roman Characters

Symbol	Description	Unit
a	empirical stoichiometric coefficient	
c	frozon sound speed	m/s

Greek Characters

Symbol	Description
α	velocity transmission factor
β	temperature transmission factor

Subscripts

Symbol	Description
CJ	Chapman-Jouguet state
c	convection

Operators

Symbol	Description
∇	difference
∇	gradient operator

Abbreviations

Acronym	Description
CJ	Chapman-Jouguet
ZND	Zel'dovich-von Neumann-Doering

Chapter 1

A Brief Guide

1.1   What is LaTeX

LaTeX (pronounced "Lah-tech" or "Lay-tech") is a macro package created by Leslie Lamport based on TeX. As a document preparation system for high-quality typesetting in almost any forms of publishing, LaTeX is not the name of a particular editing program, but refers to the encoding or tagging conventions that are used in LaTeX documents [1, 2]. The best resource to learn LaTeX is "LaTeX Wikibook", which is available online.

1.2   Why use LaTeX?

There are a lot of good reasons why you need to use LaTeX, the most significant one is the following:

- Allows you to clearly separate the content from the format of your document.

- Let you concentrate on your ideas, not visual appearance.

You can concentrate purely on the structure and contents of your document, not superficial layout issues. You don't need to manually adjust fonts, text sizes, line heights, or text flow for readability, as LaTeX takes care of them automatically. [3]
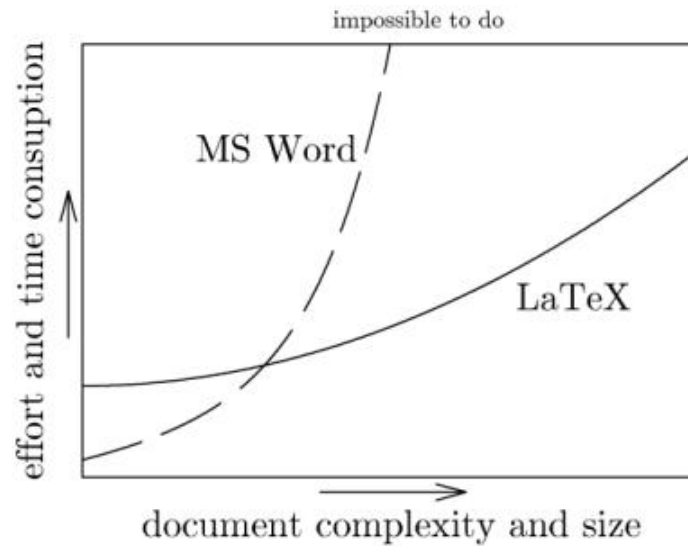
Figure 1.1: Comparison between Microsoft Word and LATEX [From Google Images]

1.3   How to use?

1.3.1   Installation

LaTeX is based on open-source code, so it is available on most computing platforms as free software. If encounter some compiling problems after installation, please Google it. For example, MikTeX may complain about "mathtools.sty", a solution given on "StackExchange" is "The problem is that the package manager has somehow "desynchronized" (even though it's a fresh install). To fix it, run Miktex Package Manager as administrator—"Package Manager (Admin)". Go to Repository–Synchronize. When that completes, your TexWorks should automatically find the needed style files again."

- Linux: TeXLive distribution.

- MacOS: Mactex or TeXLive.

- Windows: MikTeX or TeXLive.

Note: to use LATEX, you need a text editor for writing and editing ".tex" files. To open the ".tex" files in this template, you need a text editor which supports "UTF-8" encoding. Free options for different platforms are the following:

- Linux: vim.

- MacOS: TeXShop, Macvim.

- Windows: Texmaker, Gvim, Notepad++.

1.3.2 Give a try

After downloading this template and installing a LATEX distribution. It's time to have a try:

- Linux: run Compile.sh

- MacOS: run Compile.sh

- Windows: run Compile.bat

Note: It's recommended to use the provided scripts to compile your LATEX files. It will automatically search and include files without explicitly specifying relative paths. If you do not use them for compilation, you need to specify the relative path in each "\input{ }" command, or the LATEX will complain that it can not find some files.

Note: the bash script "Compile.sh" hasn't been tested on MacOS. If there are some errors, please give me your feedback, thank you so much.

1.3.3 Include math

LATEX realization of Equation 1.1 is something like this:

```
\begin{equationa}\label{eq:N-S_equation}
    \frac{\partial (\rho\mathbf{v})}{\partial t} +
    \nabla \cdot (\rho \mathbf{v} \mathbf{v}) =
    -\nabla p + \nabla \cdot\mathbf{T} + \mathbf{f}.
\end{equation}
```

$$\frac{\partial(\rho\mathbf{v})}{\partial t} + \nabla \cdot (\rho\mathbf{v}\mathbf{v}) = -\nabla p + \nabla \cdot \mathbf{T} + \mathbf{f}. \tag{1.1}$$

1.3.4 Include Graphics

Note: inluding figures may seem to be scary by looking at the codes. However, the fact is that you only need to modify the names in each part, the rest are simply copy and paste. These codes are all available in the file "Useful Commands.txt".

Figure 1.2 is an example for including a single figure.

```
\begin{figure}[!htbp]
    \centering
    \includegraphics[width=\MyFactor\textwidth]{ITC_Q_Criteria}
    \caption{An Example for including a single figure}
    \label{fig:ITC_Q_Criteria}
\end{figure}
```
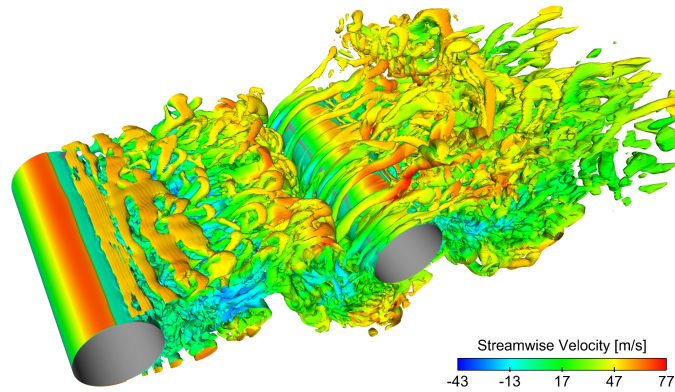
Figure 1.2: An Example for including a single graph

Figure 1.3 is an example for including multiple figuress.

```
\begin{figure}[!htbp]
    \centering
    \begin{subfigure}[b]{\MySubFactor\textwidth}
        \includegraphics[width=\textwidth]{HC_OASPL_A}
        \caption{}
        \label{fig:HC_OASPL_A}
    \end{subfigure}%
    ~% add a small space
    \begin{subfigure}[b]{\MySubFactor\textwidth}
        \includegraphics[width=\textwidth]{HC_OASPL_B}
        \caption{}
        \label{fig:HC_OASPL_B}
    \end{subfigure}%
    \\% change line
    \begin{subfigure}[b]{\MySubFactor\textwidth}
        \includegraphics[width=\textwidth]{HC_OASPL_C}
        \caption{}
        \label{fig:HC_OASPL_C}
    \end{subfigure}%
    ~% add a small space
    \begin{subfigure}[b]{\MySubFactor\textwidth}
        \includegraphics[width=\textwidth]{HC_OASPL_D}
        \caption{}
        \label{fig:HC_OASPL_D}
    \end{subfigure}%
    \caption{An Example for including multiple figures}
    \label{fig:HC_OASPL}
```
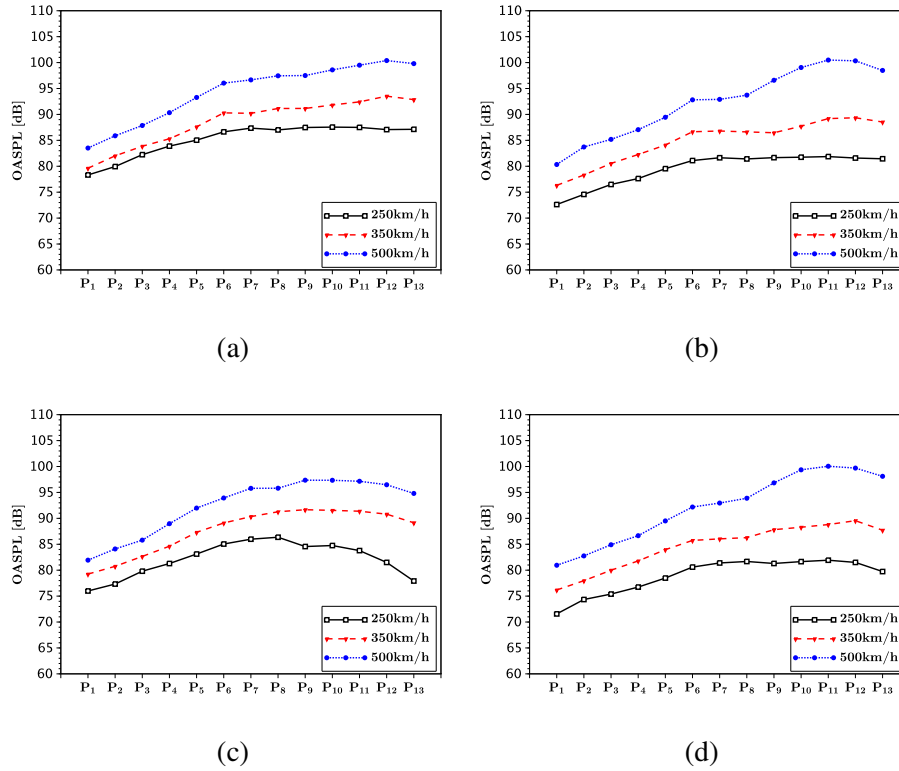
```
\end{figure}
```


(a)

(b)

(c)

(d)

Figure 1.3: An Example for including multiple figures

1.3.5   Include a citation

Suppose you are going to cite an article named "Document Preparation System", the procedures are:

- Use Google Scholar search "Document Preparation System".

- Open "Cite" and choose "Import to Bibtex" under the target item.

- Copy the citation information of this article into the file "Myrefs.bib"

- Research dominant: cite this article by `\citep{lamport1986document}` like here [4]

- Citation dominant: cite this article by `\citet{lamport1986document}` like here Lamport [4]

- References list is generated automatically.

1.3.6   Generate nomenclature

In this template, a simple command for adding nomenclatures is provided. Therefore, packages for automatical nomenclature generation are not included. From my point of view, there is no need to use those packages and make things complicated. However, if you insist, there are a lot of available packages for creating nomenclatures. Recommended options are (Please Google the one you want to know):

- listofsymbols

- nomencl

1.4   File Tree of Current Template

- Thesis.tex: main tex file, which acts like the main function in C++.

- Style: Store template configuration files, which act like subfunctions.

- Tmp: Store files generated by compilation.

- Biblio: Store information of references.

- Img: Store images.

- Tex: Store files for your content, this is the working directory.

    - Frontpages: content of front pages, like authorship, abstract, etc.
    - Prematter: content of nomenclature, etc.
    - Main_Content: index for chapters you want to include into your current content.
    - Chap_***: your content for each chapters.
    - Appendix: appendix.
    - Useful Commands: collection of useful commands.

Note: this template can be easily adapted to other writing purposes such as articles. What you need to do is to change and adjust a few items in the "Thesis.tex" file, which would be very easy after you are a little familiar with using LATEX. Like :

Change `\documentclass{uwaterloothesis}` to `\documentclass{article}`
Note: available options for configureing current template.

```
%%%% -----------------------------------------------------------------------------
%%
%%%%**************************Document Class Declaration*****************************
%%
\documentclass[doublesided]{uwaterloothesis}% thesis template of University of Waterloo
%% Multiple Options:
%% [doublesided] % change to double-sided style, default is single-sided
%% [printcopy] % if printed, need this for a uniform binding width
%% [draftversion] % show draft version information, default is no show
%% [standard options for book class]
%%%% -----------------------------------------------------------------------------
%%
%%%%**************************Command Define and Settings*****************************
%%
\usepackage{commons}% common settings
%% usage: \usepackage[option1,option2,...,optionN]{commons}
%% Multiple Options:
%% [fancyhdr] % configure header and footer by fancydhr package
%% [uwaterloo] % one available header and footer style, will auto enable fancyhdr
%% [geometry] % configure page layout by geometry package
%% [numeric] % enable numeric citation mode replace the default "APA" style
%% [list] % enable enhanced list environments, useful for Algorithm and Coding
%% [color] % enable color package to use color, current package is xcolor
%% [background] % enable page background, will auto enable color package
%% [tikz] % enable tikz for complex diagrams, will auto enbale color package
%% [table] % enable a table package for complex tables, current is ctable
\usepackage{custom}% user defined commands
```

1.5   Feedback and Problems

Please feel free to send me emails for any related problems:

<div align="center">

huangrui.mo@uwaterloo.ca

</div>

APPENDICES

Appendix A

Other Imformation

References

[1] Wikipedia, LaTeX, http://en.wikipedia.org/wiki/LaTeX .

[2] LaTeX, LaTeX – A document preparation system, http://www.latex-project.org/ .

[3] Wikibook, LaTeX, http://en.wikibooks.org/wiki/LaTeX .

[4] L. Lamport, Document Preparation System, Addison-Wesley Reading, MA, 1986.