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LaTeX

Preliminary for producing academic works

Contents

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- What is LaTeX?
- Installing the LaTeX program
- Commands
- Structure
- Heading
- Basic writing

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What is LaTeX?

Installing LaTeX program

Getting MiKTeX

MiKTeX is available for selected operating systems.

Please check the prerequisites in order to find out whether your system is supported.

If your system is not (yet) supported: it is not too difficult to build MiKTeX.

Windows | Mac | Linux | Docker | All downloads

Installer | Portable Edition | Command-line installer

To install a basic TeX/LaTeX system on Windows, download and run this installer.

Please read the tutorial, if you want step-by-step guidance.

Date:	6/8/2021
File name:	basic-miktex-21.6-x64.exe
Size:	128.02 MB
SHA-256:	299f2eb278409c672ba38941388c9d9e70182b7b1ba61319bc7128bbb9051a6d

Download

1

Getting MiKTeX

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If your system is not (yet) supported: it is not too difficult to build MiKTeX.

Windows | Mac | Linux | Docker | All downloads

- Basic Installer 64-bit
- Basic Installer 32-bit
- Net Installer 64-bit
- Net Installer 32-bit
- MiKTeX Setup Utility 64-bit
- MiKTeX Setup Utility 32-bit
- Drag'n'Drop installer 64-bit
- MiKTeX Source Code

Choose bit

Getting MiKTeX

MiKTeX is available for selected operating systems.

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If your system is not (yet) supported: it is not too difficult to build MiKTeX.

2

Windows | Mac | Linux | Docker | All downloads

Basic Installer 64-bit

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Date:	6/8/2021
File name:	basic-miktex-21.6-x64.exe
Size:	128.02 MB
SHA-256:	299f2eb278409c672ba38941388c9d9e70182b7b1ba61319bc7128bbb9051a6d

Download

Download

Basic Installer 32-bit

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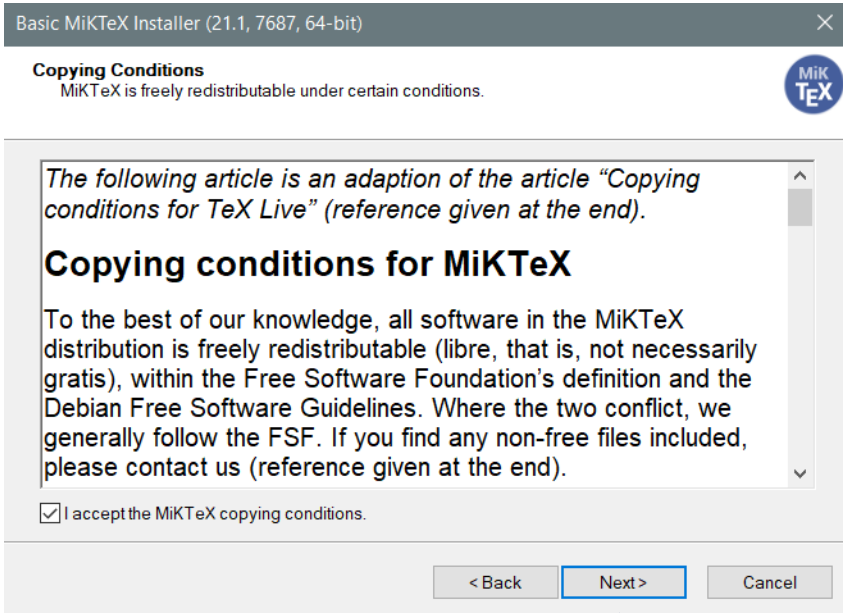
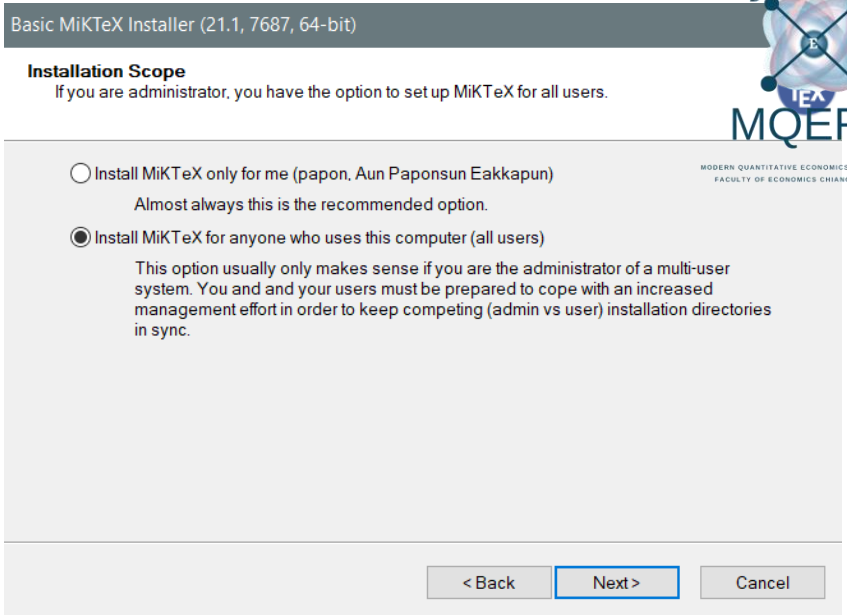

Basic MiKTeX Installer (21.1, 7687, 64-bit)
Copying Conditions
MiKTeX is freely redistributable under certain conditions.
The following article is an adaption of the article "Copying conditions for TeX Live" (reference given at the end).
Copying conditions for MiKTeX
To the best of our knowledge, all software in the MiKTeX distribution is freely redistributable (libre, that is, not necessarily gratis), within the Free Software Foundation's definition and the Debian Free Software Guidelines. Where the two conflict, we generally follow the FSF. If you find any non-free files included, please contact us (reference given at the end).
I accept the MiKTeX copying conditions.
< Back
Next >
Cancel

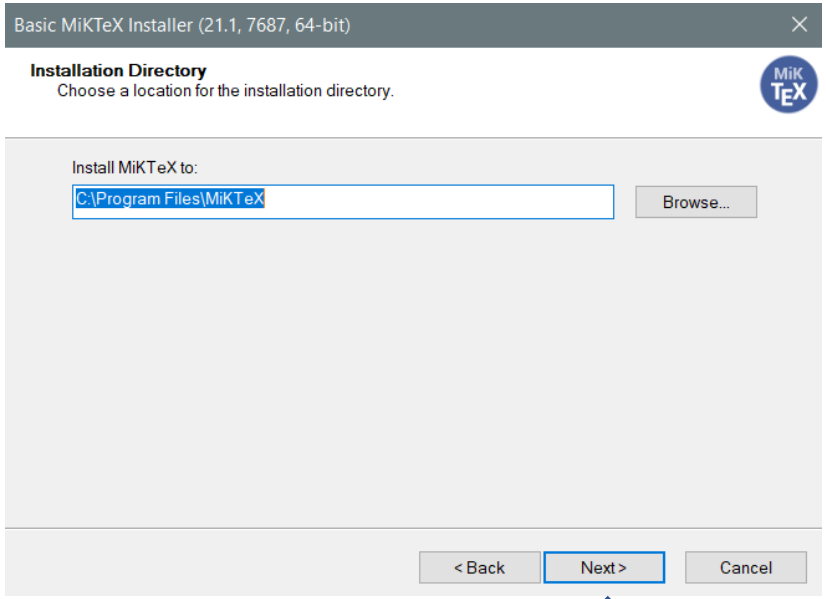
3

Next


Basic MiKTeX Installer (21.1, 7687, 64-bit)
Installation Scope
If you are administrator, you have the option to set up MiKTeX for all users.
Install MiKTeX only for me (papon, Aun Paponsun Eakkapun)
Almost always this is the recommended option.
Install MiKTeX for anyone who uses this computer (all users)
This option usually only makes sense if you are the administrator of a multi-user system. You and and your users must be prepared to cope with an increased management effort in order to keep competing (admin vs user) installation directories in sync.
< Back
Next >
Cancel

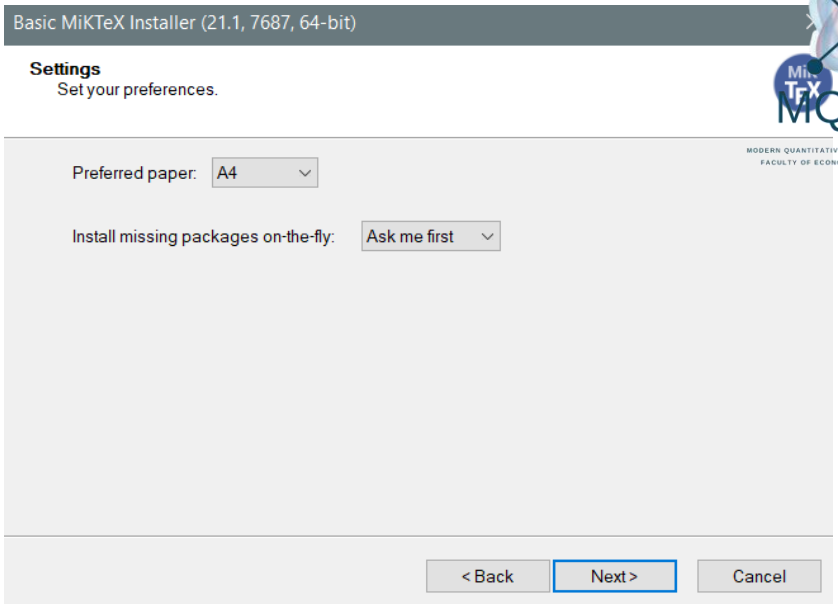
4

Next



5

Next



6

Next

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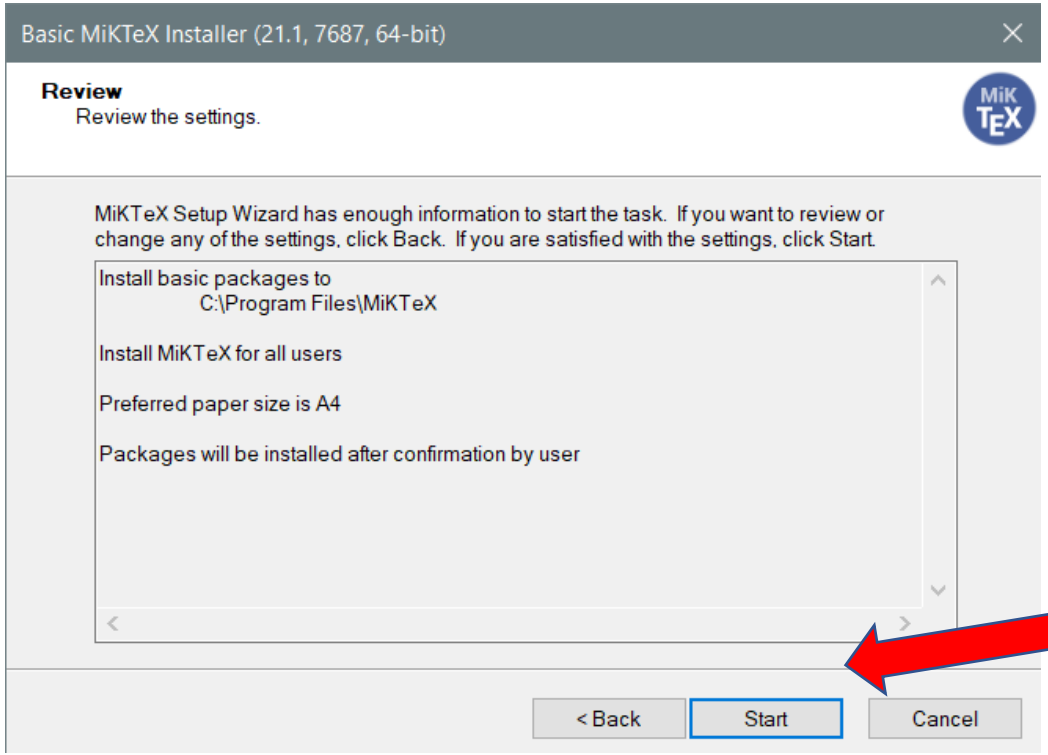

7

Start

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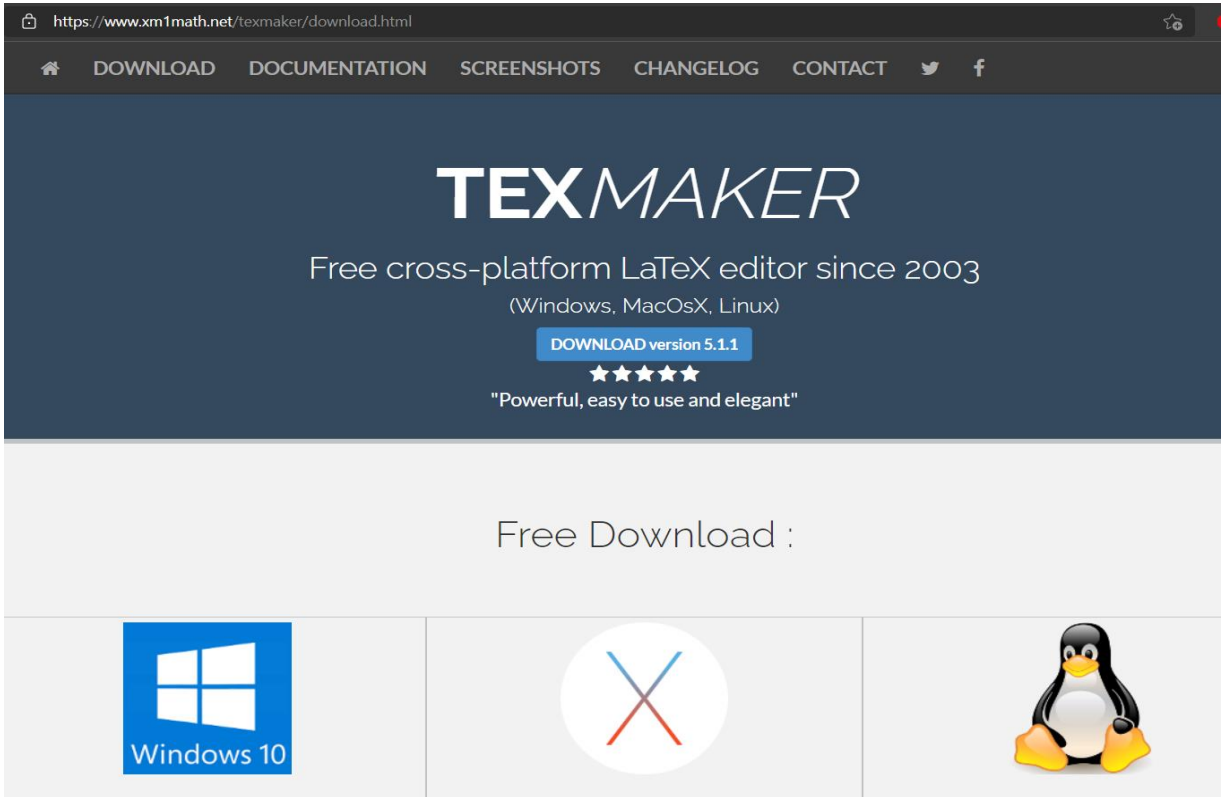
https://www.xm1math.net/texmaker/download.html



Free Download :

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Windows Package:

Desktop msi installer for windows 7/8/10 64 bits

TEXMAKER 5.1.1
Texmaker_5.1.1_Win_x64.msi

(any previous version must be uninst... before installing this new one)

Alternative download link

Portable version for windows 7/8/10 64 bits

TEXMAKER 5.1.1
texmakerwin64usb.zip

Alternative download link

MacOS X Package:

MacOSX (>=10.12) dmg package 64 bits

TEXMAKER 5.1.1
texmaker-5.1.1.dmg

Alternative download link

If you see a warning "Texmaker.app can't be opened because the ...annot be verified" : control-click the texmaker.app in Finder, choo... the menu, and then click Open in the dialog that appears. En... name and password to open the app.
Will r... with rosetta2 on M1 chip.
On Big Sur, change the editor font in the Texmaker settings (the default one will not run correctly as Apple has changed the font management)

Download

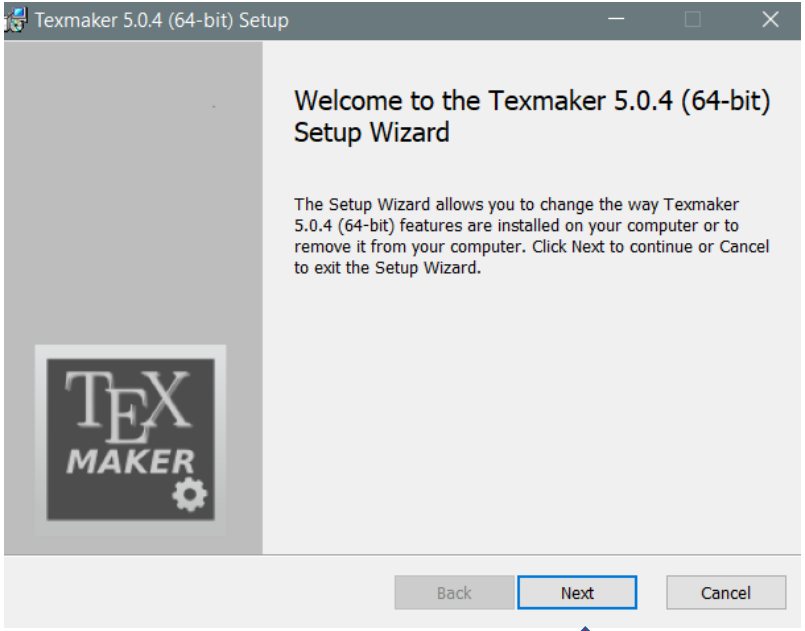
Linux Packages:

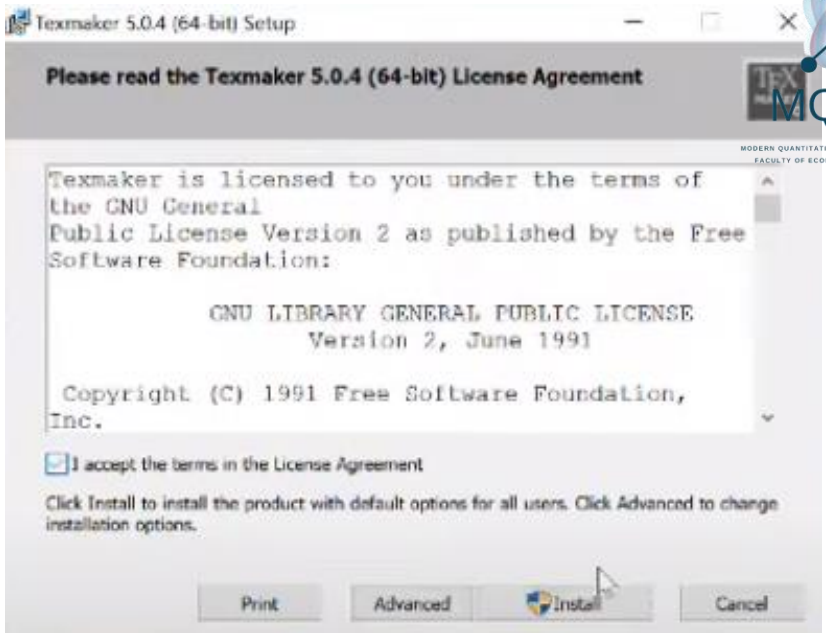
- DEBIAN 10
- DEBIAN 9

- UBUNTU 21.04
- UBUNTU 20.04
- UBUNTU 19.04
- UBUNTU 18.04

- FEDORA 34
- FEDORA 33

- OPENSUSE 15.3





Next

Install

Finish

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Commands LaTeX

Commands LaTeX

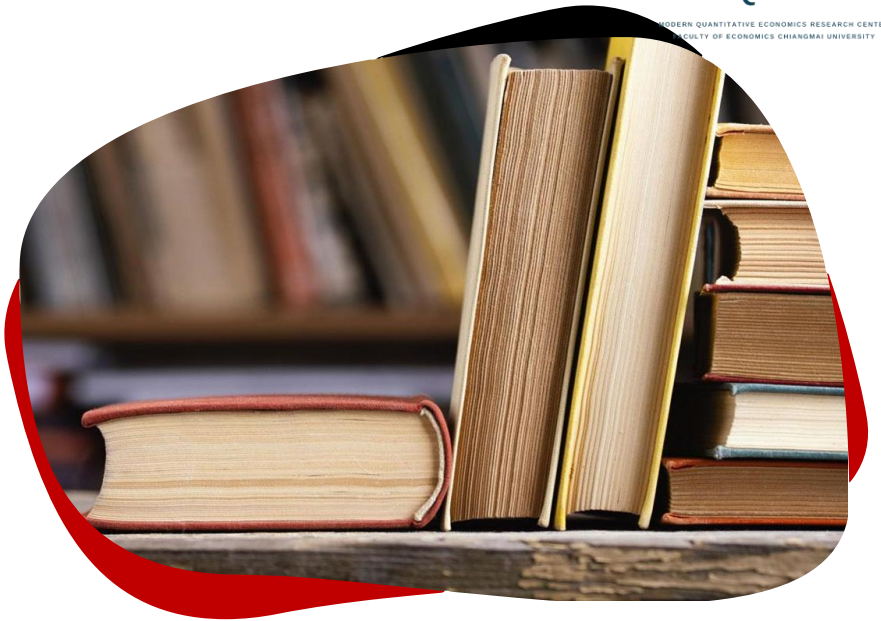
- \command (is the name)
- \command[option]{parameter}

*option is an option to execute commands If not, the program uses the default options. Parameters are required and depend on the command.

Basic Structure

\documentclass[option] {Document type }
\usepackage{Name package}

…
\begin{document}
…
Document content ……
…
\end{document}



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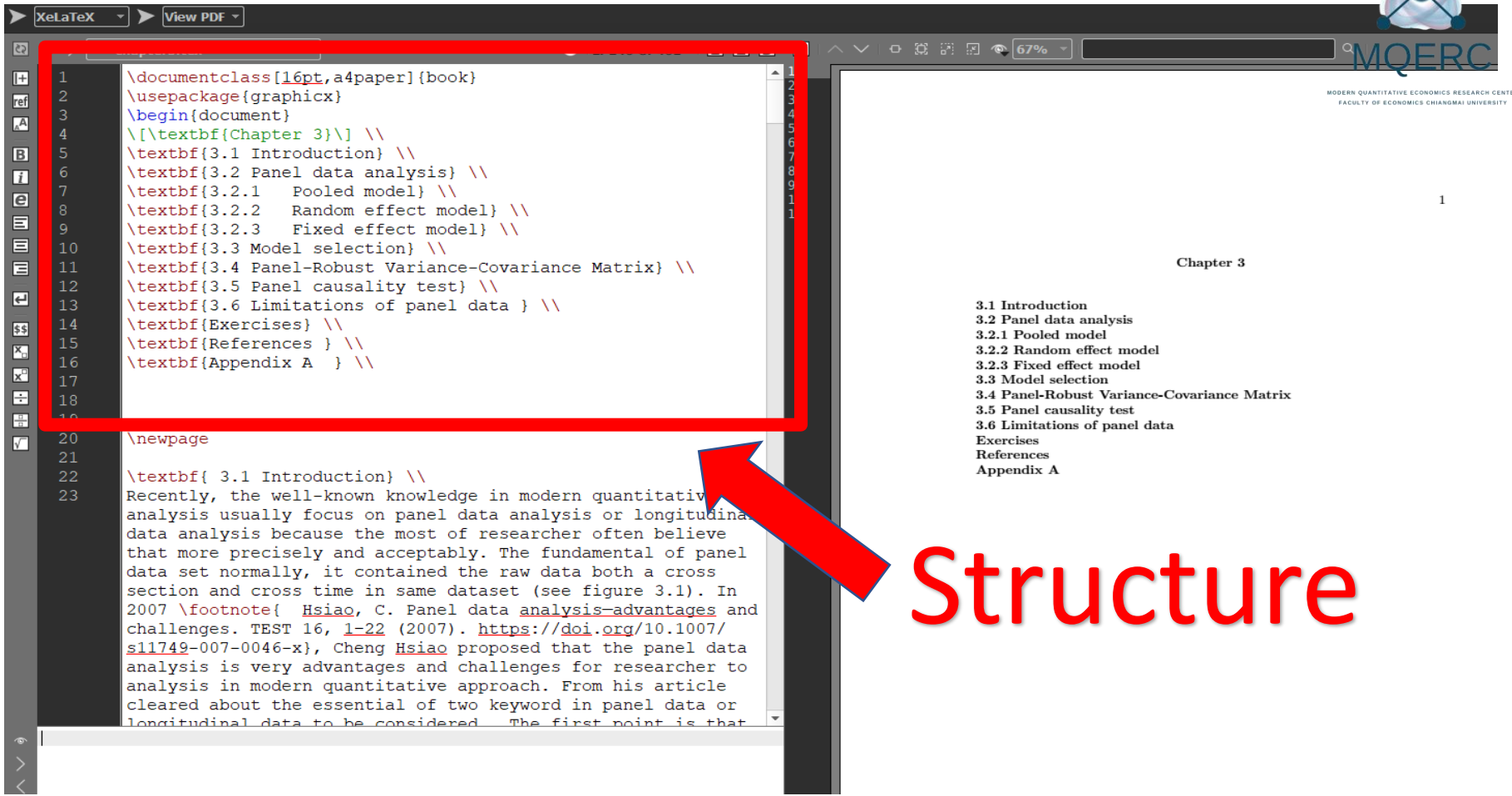
- \documentclass It is used to identify the type of document, which are of two types, article and book.
- [option] Used to specify specific characteristics of the document such as page size, font size, etc.

If not, you can delete it in this section. The program will use default values when creating documents.


XeLaTeX
View PDF
67%
\documentclass[16pt,a4paper]{book}
\usepackage{graphicx}
\begin{document}
\[\textbf{Chapter 3}\] \\
\textbf{3.1 Introduction} \\
\textbf{3.2 Panel data analysis} \\
\textbf{3.2.1 Pooled model} \\
\textbf{3.2.2 Random effect model} \\
\textbf{3.2.3 Fixed effect model} \\
\textbf{3.3 Model selection} \\
\textbf{3.4 Panel-Robust Variance-Covariance Matrix} \\
\textbf{3.5 Panel causality test} \\
\textbf{3.6 Limitations of panel data } \\
\textbf{Exercises} \\
\textbf{References } \\
\textbf{Appendix A } \\
\newpage
\textbf{ 3.1 Introduction} \\
Recently, the well-known knowledge in modern quantitativ
analysis usually focus on panel data analysis or longitudina
data analysis because the most of researcher often believe
that more precisely and acceptably. The fundamental of panel
data set normally, it contained the raw data both a cross
section and cross time in same dataset (see figure 3.1). In
2007 \footnote{ Hsiao, C. Panel data analysis—advantages and
challenges. TEST 16, 1–22 (2007). https://doi.org/10.1007/
s11749-007-0046-x}, Cheng Hsiao proposed that the panel data
analysis is very advantages and challenges for researcher to
analysis in modern quantitative approach. From his article
cleared about the essential of two keyword in panel data or
longitudinal data to be considered. The first point is that
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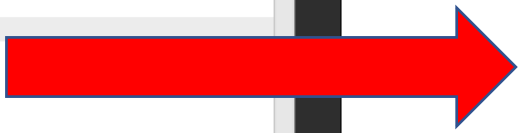
1
Chapter 3
3.1 Introduction
3.2 Panel data analysis
3.2.1 Pooled model
3.2.2 Random effect model
3.2.3 Fixed effect model
3.3 Model selection
3.4 Panel-Robust Variance-Covariance Matrix
3.5 Panel causality test
3.6 Limitations of panel data
Exercises
References
Appendix A
Structure

Important Commands

- Heading

1. \section{Main Topic}
2. \subsection{Subheading}

```
\section{Introduction}
\subsection{subsection Example}
```



Figure

1 Introduction

1.1 subsection Example

Important Commands

- Commands about the spacing between characters and between lines.

\\	break the line
\noindent	No indent
\qquad	space

Important Commands

- Commands about character styles
  - Bold

    \textbf {bold}
  - Italic

    \textit {italic}

Important Commands

- Commands about character styles

  - Uppercase

\textsc {uppercase}

Important Commands

-Commands of Equations

Dollar sign $

$ equation $

.....

.....

```
231
232 \textbf{3.2.3   Fixed effect model}
233 \\
234 The fixed effect model is very useful whenever there are
    unique attributes of individuals in panel data. Typically
    panel data approach was under explained by $\alpha _{i}$.
    Whenever $\alpha_{i}$ is treated as a random variable in
    panel data group then it would be called that a random effect
    model. In addition, whenever  is treated as a fixed effect in
    panel data group then it would be called a fixed effect model
    $(cov(x_{it},\alpha _{i})\neq 0,t = 1,...,T)$. The advantage
    of fixed effect model for panel data is to control for
    unobserved heterogeneity (see figure 3.2) which it is
    consistent over time and correlated with exogenous variables
    or independent variables in panel model. Figure 3.1 describes
    the main idea for heterogeneity problems in panel data under
    the estimation that pooled regression by OLS is not
    appropriate. Nevertheless, the fixed effect model would be
    conducted to estimate this situation. When the pooled
    regression by OLS was used to estimate some kind of
    heterogeneity problem in panel data, then the results are
    called heterogeneity bias. Mathematical modeling for fixed
    effect model can be described by equation (3.12).
235 \\
236 \[y_{it}=\sum_{j=1}^{N}\alpha _{j}d_{it}^{j}+x_{it}^{'}\beta
    +u_{it},u_{it}iid(0,\sigma _{u}^{2}) \qquad (3.12)\]
237
```

3.2.3 Fixed effect model

The fixed effect model is very useful whenever there are unique attributes of individuals in panel data. Typically panel data approach was under explained by α_i. Whenever α_i is treated as a random variable in panel data group then it would be called that a random effect model. In addition, whenever is treated as a fixed effect in panel data group then it would be called a fixed effect model $(cov(x_{it}, \alpha_i) \neq 0, t = 1, ..., T)$. The advantage of fixed effect model for panel data is to control for unobserved heterogeneity (see figure 3.2) which it is consistent over time and correlated with exogenous variables or independent variables in panel model. Figure 3.1 describes the main idea for heterogeneity problems in panel data under the estimation that pooled regression by OLS is not appropriate. Nevertheless, the fixed effect model would be conducted to estimate this situation. When the pooled regression by OLS was used to estimate some kind of heterogeneity problem in panel data, then the results are called heterogeneity bias. Mathematical modeling for fixed effect model can be described by equation (3.12).

$$y_{it} = \sum_{j=1}^{N} \alpha_j d_{it}^{j} + x_{it}^{'}\beta + u_{it}, u_{it} iid(0, \sigma_u^2) \qquad (3.12)$$

Important Commands

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-Commands of Equations

```
\begin{equation}
.....
.....
\end{equation}
```

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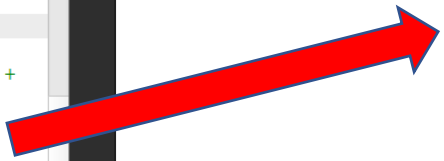
```
\section{Introduction}
\subsection{subsection Example}
```

```
\begin{equation}
y_{it} = \alpha _{i}^{*}+ \sum_{k=1}^{K}\beta _{k}x_{kit} +
u_{it}
\end{equation}

\begin{equation}
y_{it} = \alpha _{it}^{*}+ \sum_{k=1}^{K}\beta _{k}x_{kit} +
u_{it}
\end{equation}
```



1 Introduction

1.1 subsection Example

$$y_{it} = \alpha_i^* + \sum_{k=1}^{K} \beta_k x_{kit} + u_{it} \quad (1)$$

$$y_{it} = \alpha_{it}^* + \sum_{k=1}^{K} \beta_k x_{kit} + u_{it} \quad (2)$$

Important Commands

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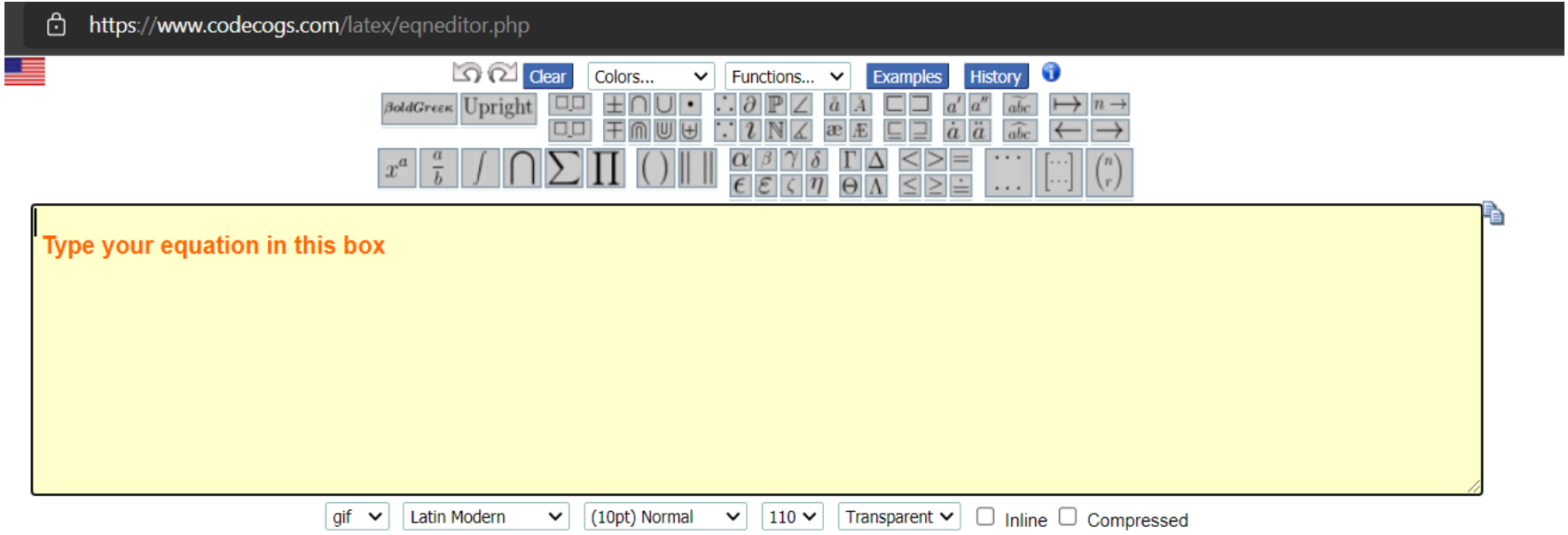
-Commands of Equations

https://www.codecogs.com/latex/eqneditor.php



https://www.codecogs.com/latex/eqneditor.php

Clear | Colors... | Functions... | Examples | History

BoldGreek | Upright

```
\[y_{it}=\sum_{j=1}^{N}\alpha _{j}d_{it}^{j}+x_{it}^{'}\beta +u_{it},u_{it}iid(0,\sigma _{u}^{2}) \qquad (3.12)\]
```

gif | Latin Modern | (10pt) Normal | 110 | Transparent | Inline | Compressed

Equations

$$[y_{it} = \sum_{j=1}^{N} \alpha_j d_{it}^j + x_{it}^{'}\beta + u_{it}, u_{it} iid(0, \sigma_u^2) \qquad (3.12)]$$

Click here to Download Image (GIF)

Preview

Important Commands

- Command of Figure

```
\usepackage{graphicx}
…
…
\begin{figure}[position figure]
 \includegraphics[width=1.0\textwidth]{name figure}
 \caption{figure1}
\end{figure}
```

Important Commands

- Command of Figure

- Image Position

h	From letters
t	Place it on top of the page
b	Place it at the bottom of the page
P	Independent

XeLaTeX ▸ View PDF

chapter3.tex — L: 1 C: 1 — 66%

```
heterogeneity problem in panel data, then the results are
called heterogeneity bias. Mathematical modeling for fixed
effect model can be described by equation (3.12).
\\
\[y_{it}=\sum_{j=1}^{N}\alpha _{j}d_{it}^{j}+x_{it}^{'}\beta
+u_{it},u_{it}iid(0,\sigma _{u}^{2}) \qquad (3.12)\]


\newpage
And the dummy is $d^{j}$ , where $d_{it}^{j}$ =1 if i = j,
and 0 else. The slope coefficient ( $\beta$ ) of LSDV (LS
dummy variable estimator) can be estimated by OLS approach.
In addition, $y_{it}$ is a dependent variable and $x_{it}^{'}
$ is an independent variable of the fixed effect model.
Furthermore, $u_{it}$  is going to the process of independent
and identically distributed (i.i.d.) or it will follow the
pattern of normal distribution.
\\
\begin{figure}[h!]
 \centering
  \vspace{-1.4in}
  \includegraphics[width=0.8\textwidth]{fig/fig.6.pdf}
  \vspace{-1.2in}
 \end{figure}

Consider the procedure of estimation for fixed effected model
to fix the problem of heterogeneity in panel model. From
equation (3.12), the slope coefficient ($\beta$) is obtained
by LS estimator while this coefficient can be calculated by a
completed process from the start of computing the equation
(3.13) until equation (3.14). The average of individual (i)
of panel model can be calculated by equation (3.15).
\\
\[\bar{y}_{i}=\sum  _{t} y_{it} /T,\bar{\alpha}_{i} =\alpha
 _{i},\bar{u}_{i} = 0,\bar{x}_{i} =\sum  _{t}x_{it}/T  \qquad
```


And the dummy is d^j , where d_{it}^j =1 if i = j, and 0 else. The slope coefficient (β) of LSDV (LS dummy variable estimator) can be estimated by OLS approach. In addition, y_{it} is a dependent variable and $x_{it}^{'}$ is an independent variable of the fixed effect model. Furthermore, u_{it} is going to the process of independent and identically distributed (i.i.d.) or it will follow the pattern of normal distribution.

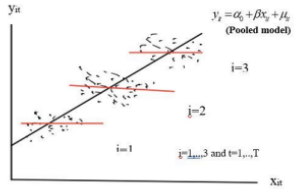


Figure 3.2 presents the heterogeneity problem by graphically

Consider the procedure of estimation for fixed effected model to fix the problem of heterogeneity in panel model. From equation (3.12), the slope coefficient (β) is obtained by LS estimator while this coefficient can be calculated by a completed process from the start of computing the equation (3.13) until equation (3.14). The average of individual (i) of panel model can be calculated by equation (3.15).

$$\bar{y}_i = \sum_t y_{it}/T, \bar{\alpha}_i = \alpha_i, \bar{u}_i = 0, \bar{x}_i = \sum_t x_{it}/T \qquad (3.13)$$

$$\bar{y}_i = \alpha_i + \bar{x}_{it}'\beta + \bar{u}_i$$

$$\bar{y}_{it} = \alpha_i + \bar{x}_{it}'\beta + \bar{u}_{it} (Panel\ Group\ model) \qquad (3.14)$$

Example :

Important Commands

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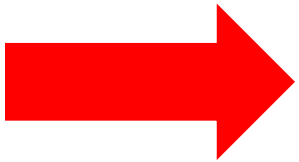
- Command of Table

```
\begin{tabular}{|c|c|c|}
\hline
text & text  \\
\hline
text & text \\
\hline
\end{tabular}
```

Example :

```
\begin{tabular}{|c|c|c|}
\hline
text & text & Test \\
\hline
text & text & Test\\
\hline
\end{tabular}
```



text	text	Test
text	text	Test

https://www.tablesgenerator.com/latex_tables#

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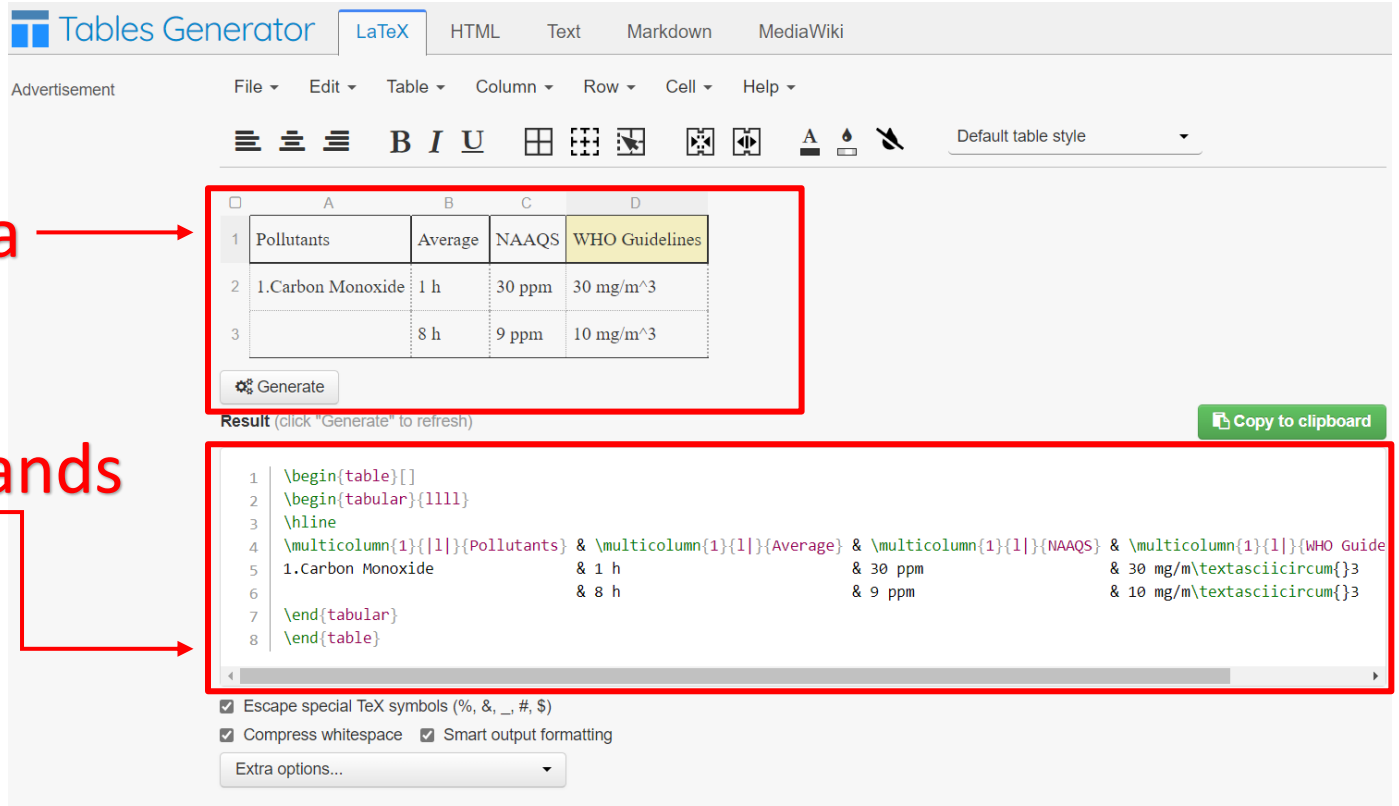
Put Data

Commands



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Commands

```
\begin{table}[h]
\begin{tabular}{|lllll|}
\hline
\multicolumn{1}{|c|}{Pollutants} & \multicolumn{1}{c|}
{Average} & \multicolumn{1}{c|}{NAAQS} & \multicolumn{1}{c|}
{WHO Guidelines} \\ \hline
1.Carbon Monoxide                    & 1 h
& 30 ppm                        & 30 mg/m\textasciicircum{}3
\\
                                     & 8 h
& 9 ppm                         & 10 mg/m\textasciicircum{}3
\\ \hline
\end{tabular}
\end{table}
```

Result

Pollutants	Average	NAAQS	WHO Guidelines
1.Carbon Monoxide	1 h	30 ppm	30 mg/m^3
	8 h	9 ppm	10 mg/m^3

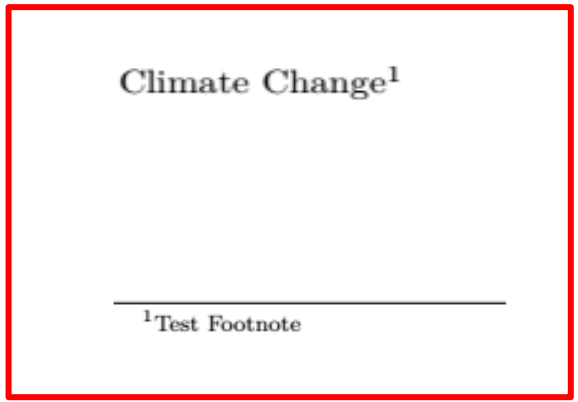
Important Commands

- Command of Footnote

\footnote{…Text…..}

Example :

```
Climate Change\footnote{Test Footnote}
```



Important Commands

- Symbol

\	\textbackslash
&	\&
^	\^{}
{	\{
}	\}
-	\-
#	\#
%	\%
$	\$
~	\~{}

Other commands

\newpage
\vspace{phase}

New page
spaced line spacing