An Elegant LaTeX Template for Books

Classic ElegantLaTeX Template

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Institute: ElegantLaTeX Program

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Victory won't come to us unless we go to it.

Contents

Chapter 1 ElegantLATEX Templates

———◦∞◦◦———

ElegantLATEX Program developers are intended to provide you beautiful, elegant, user-friendly templates. Currently, the ElegantLATEX is composed of ElegantNote, ElegantBook, ElegantPaper, designed for typesetting notes, books, and working papers respectively. Latest releases are strongly recommended! This guide is aimed at briefly introducing the 101 of this template. For any other question, suggestion or comment, feel free to contact us on GitHub issues or email us at `elegantlatex2e@gmail.com`.

Contact Infos:

- Homepage: https://elegantlatex.org/
- Github: https://github.com/ElegantLaTeX/
- CTAN: https://ctan.org/pkg/elegantbook
- Wiki: https://github.com/ElegantLaTeX/ElegantBook/wiki
- Download: release, latest version
- Weibo: ElegantLaTeX
- Wechat: ElegantLaTeX
- QQ: 692108391
- Email: `elegantlatex2e@gmail.com`

1.1 ElegantBook Updates

What's new in this version:

1. Fix `\part`.
2. Introduce pad mode.
3. Support mtpro2 package.
4. Revise default format of references to numbers.
5. Include environment for chapter introduction.
6. Include environment for problem set.
7. Include margin note using `\elegantpar` (beta).
8. Reduce line spacing for equations.
9. Turn `\equote` into `\extrainfo`, with multi-line display.
10. Polish documentation by including acknowledgement, etc.

⚡ **Note** *Since the latest version has witnessed huge reconstruction (with cover change in version 3.06), 3.x is backward incompatible with 2.x. For those who would like to convert documents compiled with earlier version (3.06 or 2.x) to be compatible with latest version, please refer to conversion. Questions about version 2.x will not be answered henceforth.*

1.2 Installation and Update

Both portable version and installation package are available for this template.

For portable version, simply download lastest ElegantBook-master from Github or CTAN (to be more accurate, download `elegantbook.cls`) and save the file(s) under your working directory. This way of installation is simple and convenient, but you have to manually update `cls` now and then.

If you are a TeX Live 2019 user, using the `tlshell`[1] of TeX Live 2019 direct installation package is strongly recommended. Simply search and open `tlshell`, click on `File -> Load Default Repository` or customize repository by `Options`. Wait till the repository loads successfully, search `elegantbook` by name, installation and update is just a click away.
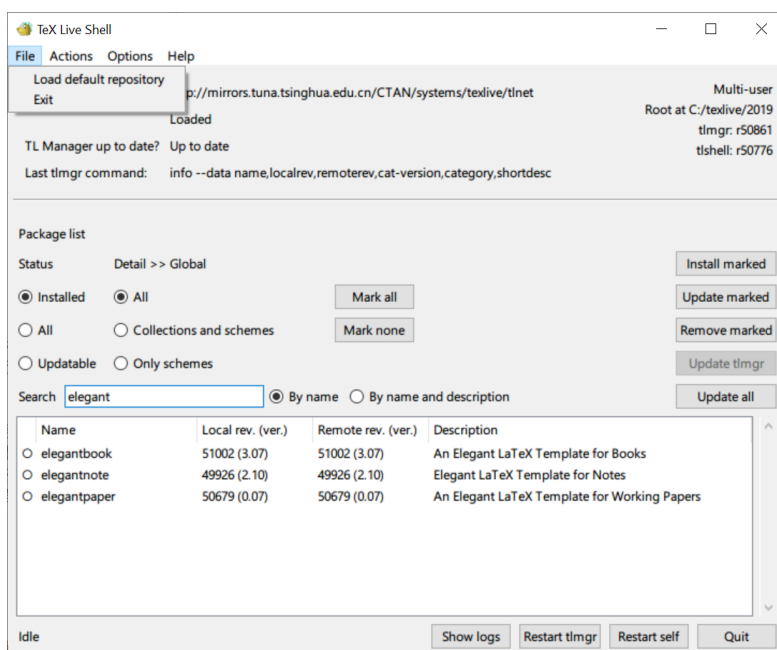

Figure 1.1: Use TeX Live Shell to Install ElegantBook Template

If you are a TeX Live 2018 user and would like to update to TeX Live 2019, the official solution is to uninstall 2018. If you want to save the bother of uninstallation and installation, please copy `elegantbook.cls` to the installation directory of TeX Live 2018 (default: `C:\texlive\2018\texmf-dist\tex\latex\elegantbook`), run `texhash` in cmd.

Excuse me? You are a CTEX user? Sorry, this template is incompatible with CTEX.

For more details about the installation and usage of TeX Live 2019, the compatibility of CTEX and TeX Live, installation directory, etc., please refer to OG (Official Guide).

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[1]namely, TeX Live Manager

1.3 Online Usage of Templates

Considering the online usage of the templates, all the templates are available on Overleaf. Those who enjoy smooth network may feel free to use the templates without TEX Live and to visit your documents anywhere anytime. Search `elegantlatex` on Overleaf or visit search result, choose the one you prefer and save it to your account, then you can edit yourself or corporate with others if you like. For more infomation about Overleaf, please refer to Overleaf OG.

1.4 User's Selected Works Plan

Eight years have passed since the found of ElegantLATEX Program. It's an honor that our templates are preferred by a lot of users. Hence, in order to promote more interactions among our users and know more about what you need, we are planning to provide a platform to display selected works of our users on Github or our homepage. If you want to show us your work(s), contact us via Email or other ways. Or if you have upload your work(s) on Github or Gitee etc., share the URL(s) with us.

1.5 About Pull Request

For some reasons, pull request is unacceptable since May 20, 2019. For those who want to help revise the templates, submit issues or clone to your own repository to modify under the constriction of LPPL-1.3c.

1.6 Recruit Support Members

Recruit Support Members for ElegantLATEX to translate template OGs(Chinese -> English), maintain wiki entries using MarkDown, update Wechat articles. No deadline for this recruitment.

Thank our best support members for their selfless work!

- OG Translator: YPY;
- Wiki Maintainer: Ingo Zinngo;
- QQ Group Manager: Sikouhjw.

1.7 Acknowledgement

The number of stars on Github for ElegantBook reached 100 on May 20, 2019 and was included in the Trending under the TEX catagory. It is a remarkable moment for ElegantLATEX !!!

Thank ChinaTEX and LATEX studio for their promotion. LATEX studio offers tons of valuable posts and templates for discovery. It is the most comprehensive website on LATEX in China.

Thank muzimuzhi for the revision of the template.

If you like our template, star on Github. Recently some users have expressed their love for
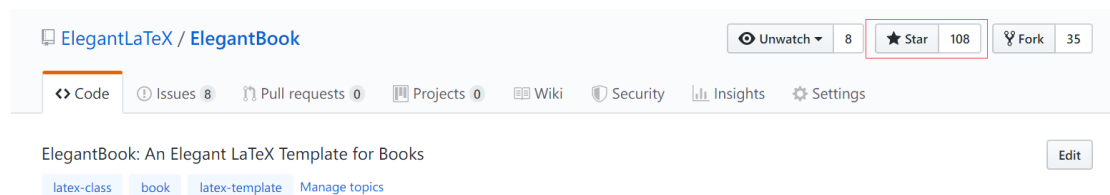

Figure 1.2: Twinkle, Twinkle, Little Star

our templates and want to tip us. QR code for donation is now available.

微信   支付宝

The explanation right of the tip usage belongs to ElegantLATEX with no supervision. Feel free to tip us. Those who donate more than 10 RMB will be recorded in the Donation List. Thank all the tippers!

Table 1.1: Donation List

Tipper	Amount	Date	Channel
Lerh	10 RMB	2019/5/15	Wechat
Yueguodipingxian	10 RMB	2019/5/15	Wechat
Dapeng	20 RMB	2019/5/27	Wechat

Chapter 2 ElegantBook Settings

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This template is based on the Standard LATEX book class, so the options of book class work as well. The default encoding is UTF-8 while TEX Live is recommended. The test environment is Win10 + TEX Live 2019.

2.1 Languages

We defined one option named `lang` which has two alternative values, `lang`=en (default) and `lang`=cn. Different values will alter the captions of figure/table, abstract name, refname, etc. You can use this option as

```
\documentclass[en]{elegantbook}
\documentclass[lang=en]{elegantbook}
```

Remark Chinese Characters are acceptable whenever `lang`=en or `lang`=cn. If you would like to include Chinese characters under (`lstlisting`) environment, please use `XeLaTeX` to compile.

2.2 Device Mode Option

The option for device (`device`) was originally used in ElegantNote, now we include this option in ElegantBook[1] as well. Activate iPad mode in the following way[2]:

```
\documentclass[pad]{elegantbook} %or
\documentclass[device=pad]{elegantbook}
```

2.3 Color Themes

This template contains 5 color themes, i.e. `green`[3], `cyan`, `blue`(default), `gray`, `black`. You can choose `green` with

```
\documentclass[green]{elegantbook} %or
\documentclass[color=green]{elegantbook}
```

If you want to customize the colors, please select `nocolor` or use `color`=none and declare the main, second, and third colors in the preamble section as follows:

```
\definecolor{structurecolor}{RGB}{60,113,183}
\definecolor{main}{RGB}{0,166,82}%
```

---

[1]Pictures have to be modified accordingly
[2]Default size: normal, A4 paper
[3]Original default theme.

Table 2.1: ElegantBook Themes

	green	cyan	blue	gray	black	Main Environments
structure						chapter section subsection
main						definition exercise problem
second						theorem lemma corollary
third						proposition

```
\definecolor{second}{RGB}{255,134,24}%
\definecolor{third}{RGB}{0,174,247}%
```

2.4 Chapter Title Display Styles

This template contains 2 sets of *title display styles*,hang(default) and `display` style. For the former, chapter title is displayed on a single line (`hang`). For the latter, chapter title is displayed on a double line (`display`).In this guide, we use `hang` . To change display style

```
\documentclass[hang]{elegantbook} %or
\documentclass[titlestyle=hang]{elegantbook}
```

2.5 Theorem Class Environments

We defined two sets of theorem modes, `simple` style and `fancy` style (default). You may change to `simple` mode by

```
\documentclass[simple]{elegantbook} %or
\documentclass[mode=simple]{elegantbook}
```

In this template, we defined four different theorem class environments

- *Theorem Environment*, including title and content, numbering corresponding to chapter. Three types depending on the format:
    - **definition** environment, the color is main;
    - **theorem, lemma, corollary** environment, the color is second;
    - **proposition** environment, the color is third.
- *Example Environments*, including **example, exercise, problem** environment, auto-numbering corresponding to chapter.
- *Proof Environment*, including **proof, note** environment containing introductory symbol (**note** environment) or ending symbol (**proof** environment).

- *Conclusion Environments*, including **conclusion, assumption, property, remark, solution**[4] environment, all of which begin with boldfaced words, with format consistent with normal paragraphs.

2.5.1 Theorem Class Environments

Since the template uses the `tcolorbox` package to customize the theorem class environments, it is slightly different from the normal theorem environments. The usage is as follows:

```
\begin{theorem}{<theorem name>}{<label>}
The content of theorem.
\end{theorem}
```

The first parameter `<theorem name>` represents the name of the theorem, and the second parameter `label` represents the label used in cross-reference with `ref{thm:label}`. Note that cross-references must be prefixed with `thm:`.

Other theorem class environments with the same usage includes:

Table 2.2: Theorem Class Environments

Environment	Label text	Prefix	Cross-reference
definition	label	def	`\ref{def:label}`
theorem	label	thm	`\ref{thm:label}`
lemma	label	lem	`\ref{lem:label}`
corrlary	label	cor	`\ref{cor:label}`
proposition	label	pro	`\ref{pro:label}`

2.5.2 Other Customized Environments

The other three math environments can be called directly since there are no additional option for them, e.g. `example`:

```
\begin{example}
This is the content of example environment.
\end{example}
```

The effect is as follows:

Example 2.1 This is the content of example environment.

These are all similar environments with slight differences lies in:

- Example, exercise, problem environments number within chapter;
- Note begins with introductory symbol and proof ends with ending symbol;
- Conclusion environment and so on are normal paragraph environments with boldfaced introductory words.

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[4]We also define an option `result`, which can hide the `solution` and `proof` environments. You can switch between `result=answer` and `result=noanswer`

2.6 Base Hide Option

Hiding the end-of-chapter base is optional, simply type in:

```
\documentclass[hide]{elegantbook} %or
\documentclass[base=hide]{elegantbook}
```

2.7 Cover and Logo

The cover image used in this template is from pixabay.com[5]. The image is completely free and can be used under any circumstance. The cover image size is 1280×1024. If you would like to change the cover, please crop it according to the size of the cover picture strictly.One free online image clipping site: befunky.com.

Aspect ratio of the logo is 1:1 in this guide, i.e. a square picture. To replace the logo, do remember to choose the appropriate picture.

2.8 List Environments

This template uses `tikz` to customize `itemize` and `enumerate` environments, with `itemize` environment customized to the third depth and `enumerate` environment customized to fourth depth. The effect is as follows

- first item of nesti;
- second item of nesti;
  - first item of nestii;
  - second item of nestii;
    - first item of nestiii;
    - second item of nestiii.

1. first item of nesti;
2. second item of nesti;
   (a). first item of nestii;
   (b). second item of nestii;
       I. first item of nestiii;
       II. second item of nestiii.

2.9 Bibliography

This template uses BIBTEX to generate the bibliography, the default bibliography style is `aer`. Let's take a glance at the citation effect. **?** use data from a major peer-to-peer lending marketplace in China to study whether female and male investors evaluate loan performance differently.

If you want to use BIBTEX, you must create a file named `reference.bib`, add bib items (from Google Scholar, Mendeley, EndNote, and etc.) to `reference.bib` file, then cite the bibkey in the `tex` file. The BibTEX will automatically generate the bibliography for the reference you cited. If you want to add some noncited reference to the bibliography, you can use

---

[5]Thank ChinaTEX for providing free image source, pexels.com is strongly recommended.

```
\nocite{EINAV2010,Havrylchyk2018} %or include some bibitems
\nocite{*} %include all the bibitems
```

Two more options `cite=numbers` and `cite=authoryear` are available in this new version, with the default setting as `numbers` since those major in science and technology use `numbers` more often. For those who major in liberal arts want to use `authoryear`, please type in:

```
\documentclass[cite=authoryear]{elegantbook} %or
\documentclass[authoryear]{elegantbook}
```

2.10 Preface

If you want to add a preface before the first chapter with the number of chapter unchanged, please add the preface in the following way:

```
\chapter*{Preface}
\addcontentsline{toc}{chapter}{Preface}
\markboth{Preface}{}
The content of Preface.
```

2.11 Introduction Environment

We create a introduction environment to display the structure of chapter. The basic useage is as follows

```
\begin{introduction}
  \item Definition of Theorem
  \item Ask for help
  \item Optimization Problem
  \item Property of Cauchy Series
  \item Angle of Corner
\end{introduction}
```

you will get:

Introduction	
❏ Definition of Theorem	❏ Property of Cauchy Series
❏ Ask for help	❏ Angle of Corner
❏ Optimization Problem	

You can change the title of this environment by modifying the optional argument of this environment

```
\begin{introduction}[Brief Introduction]
...
\end{introduction}
```

2.12 Problem Set

The environment `problemset` is used at the end of each chapter to display corresponding exercises. Just type in the following sentences:

```
\begin{problemset}
  \item exercise 1
  \item exercise 2
  \item exercise 3
\end{problemset}
```

And you will get:

⤜ Chapter 2 Exercise ⤝

1. exercise 1
2. exercise 2
3. exercise 3

Remark If you want to customize the title of `problemset`, please change the optional argument like introduction environment.

Chapter 3 ElegantBook Writing Sample

> **Introduction**
>
> ❏ Theorem Class Envrionments   ❏ List Environments
>
> ❏ Cross Reference   ❏ Logo and Base
>
> ❏ Math Environments   ❏ $a^2 + b^2 = c^2$

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

3.1 Writing Sample

We will define the integral of a measurable function in three steps. First, we define the integral of a nonnegative simple function. Let E be the measurable set in $\mathcal{R}^N$.

> **Definition 3.1. Left Coset**
>
> *Let H be a subgroup of a group G. A* left coset *of H in G is a subset of G that is of the form xH, where $x \in G$ and $xH = \{xh : h \in H\}$. Similarly a* right coset *of H in G is a subset of G that is of the form Hx, where $Hx = \{hx : h \in H\}$* ♣

Note *Note that a subgroup H of a group G is itself a left coset of H in G.*

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.

> **Theorem 3.1. Lagrange's Theorem**
>
> *Let G be a finite group, and let H be a subgroup of G. Then the order of H divides the order of G.* ♡

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

> **Proposition 3.1. Size of Left Coset**
>
> *Let H be a finite subgroup of a group G. Then each left coset of H in G has the same number of elements as H.* ♦

Proof Let z be some element of $xH \cap yH$. Then $z = xa$ for some $a \in H$, and $z = yb$ for some $b \in H$. If h is any element of H then $ah \in H$ and $a^{-1}h \in H$, since H is a subgroup of G. But $zh = x(ah)$ and $xh = z(a^{-1}h)$ for all $h \in H$. Therefore $zH \subset xH$ and $xH \subset zH$, and thus $xH = zH$. Similarly $yH = zH$, and thus $xH = yH$, as required.
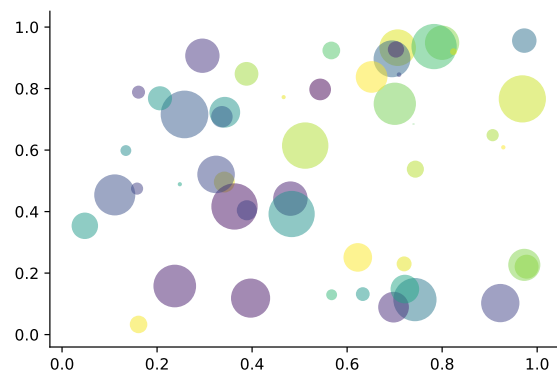
Figure 3.1: Matplotlib: Scatter Plot Example

Regression analysis is a powerful statistical method that allows you to examine the relationship between two or more variables of interest. While there are many types of regression analysis, at their core they all examine the influence of one or more independent variables on a dependent variable. The process of performing a regression allows you to confidently determine which factors matter most, which factors can be ignored, and how these factors influence each other.

Let's continue using our application training example. In this case, we'd want to measure the historical levels of satisfaction with the events from the past three years or so, as well as any

information possible in regards to the independent variables.

Table 3.1: Auto MPG and Price

	(1)	(2)
mpg	-238.90***	-49.51
	(53.08)	(86.16)
weight		1.75***
		(0.641)
constant	11,253***	1,946
	(1,171)	(3,597)
obs	74	74
R^2	0.220	0.293

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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.

- Routing and resource discovery;
  - Language Models
  - Vector Space Models
- Resilient and scalable computer networks;
- Distributed storage and search.

Chapter 3 Exercise

1. Solve the equation $5(-3x - 2) - (x - 3) = -4(4x + 5) + 13$.
2. Find the distance between the points (-4 , -5) and (-1 , -1).
3. Find the slope of the line $5x - 5y = 7$.

Chapter 4 Margin Notes

For version 3.08, we introduce margin note option and `\elegantpar` (Beta). In this template, margin note option `marginpar` is included. If `marginpar`=margintrue, the width of both sides will reduce at least 1.5cm. If `marginpar`=marginfalse, the width of sides will remain unchanged. Margin note option works under `device`=normal only.

Margin note option can be activated using `\marginpar` built in LaTeX or `\marginnote` command in `marginnote`. For more information, refer to Margin Notes or LaTeX books.

`\elegantpar` is introduced in this version. Note that TikZ overlay is used in this command, hence you have to compile three times to get the right display effect.

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et ⟨dolore magna aliqua⟩. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

$$E \equiv m\langle c^2 \rangle \tag{4.1}$$

Chapter 5 FAQ

Question I want to customize font and background color.

Solution *Please use `\pagecolor` to change background color, refer to this to customize font.*

Question Which version should I choose?

Solution *Please use Latest Release via GitHub or T_EX Live 2019.*

Question Which editor should I choose?

Solution *You can use T_EX Live 2019 built-in T_EXworks or T_EXStudio. You may refer to T_EXworks autocomplete. T_EX Live 2019 + T_EXstudio is strongly recommended. I myself use VS Code and Sublime Text. Related configurations can be found at vscode-latex and sublime-text-latex.*

Question Hello, we want to use ElegantBook to write a book about machine learning and would like your authorization.

Solution *Feel free to use our templates by pointing out our copyright. For other issues, please refer to LPPL-1.3c. If you want to show us your work, share the URL with us afterwards.*

Question I would like to use the former cover!

Solution *Cover option is forthcoming.*

Question What is cross reference?

Solution *This template is aimed at who are not a complete beginner for LaTeX. Please learn more about LaTeX before using this template.*

Question Is the language for code highlighting optional?

Solution *Yes, `listings` package is used in ElegantBook, hence language is optional. For global setting, use `\lstset`. For more information, please refer to package documentations.*

Appendix Mathematical Tools

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This appendix covers some of the basic mathematics used in econometrics. We briefly discuss the properties of summation operators, study the properties of linear and some nonlinear equations, and review the ratios and percentages. We also introduce some special functions that are common in econometrics applications, including quadratic functions and natural logarithms. The first four sections require only basic algebraic techniques. The fifth section briefly reviews differential Calculus Although Calculus is not necessary to understand much of this book, it is used in some of the end-of-chapter appendices and in some of the more advanced topics in part 3.

A.1 Summation Operator and Description Statistics

Summation Operator is an abbreviation used to express the summation of numbers, it plays an important role in statistics and econometrics analysis. If $\{x_i : i = 1, 2, \ldots, n\}$ is a sequence of n numbers, the summation of the n numbers is:

$$\sum_{i=1}^{n} x_i \equiv x_1 + x_2 + \cdots + x_n \tag{A.1}$$

Appendix A Minimal Example

```latex
\documentclass{elegantbook}
% title info
\title{Title}
\subtitle{Subtitle is here}
% bio info
\author{Your Name}
\institute{XXX University}
\date{\today}
% extra info
\version{1.00}
\extrainfo{Victory won\rq t come to us unless we go to it. --- M. Moore}
\logo{logo.png}
\cover{cover.jpg}

\begin{document}

\maketitle
\tableofcontents
\mainmatter
\hypersetup{pageanchor=true}
% add preface chapter here if needed
\chapter{Example Chapter Title}
The content of chapter one.

\bibliography{reference}
\end{document}
```