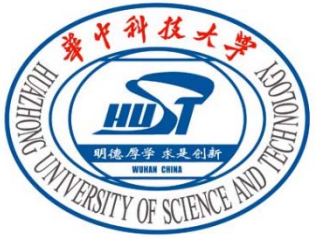


科学研究方法概论

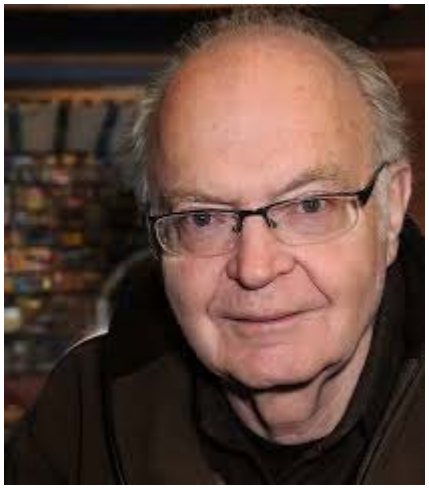
Latex 使用简介

华中科技大学
谭 山
shantan@hust.edu.cn

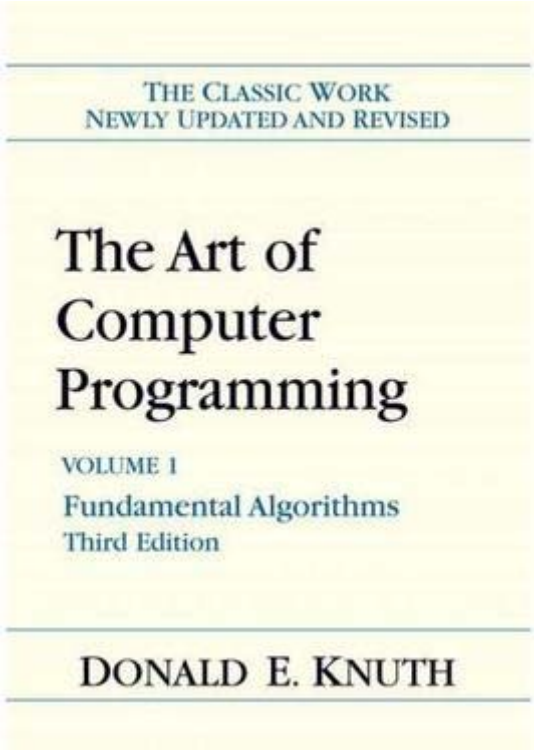
2023年5月19日

Latex起源

- Latex 是功能强大的排版系统，对于数学公式的排版，至今无人能出其右。
- 发明人：Donald E. Knuth 教授，Stanford大学计算机系教授，中文名字：高德纳。



The 1974 recipient of the ACM Turing Award

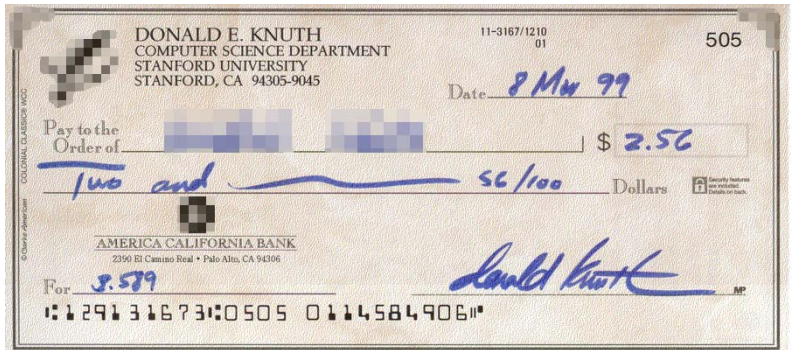


https://www-cs-faculty.stanford.edu/~knuth/

Latex起源

个人趣事：

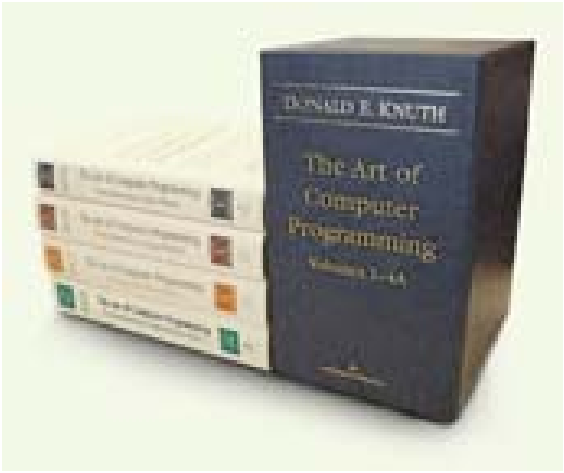
- I have been a happy man ever since January 1, 1990, when I no longer had an email address. I'd used email since about 1975, and it seems to me that 15 years of email is plenty for one lifetime.”
- Knuth used to pay a finder's fee of $2.56 for any typographical errors or mistakes discovered in his books, because "256 pennies is one hexadecimal dollar", and $0.32 for "valuable suggestions".



Computerdom's most prized trophies

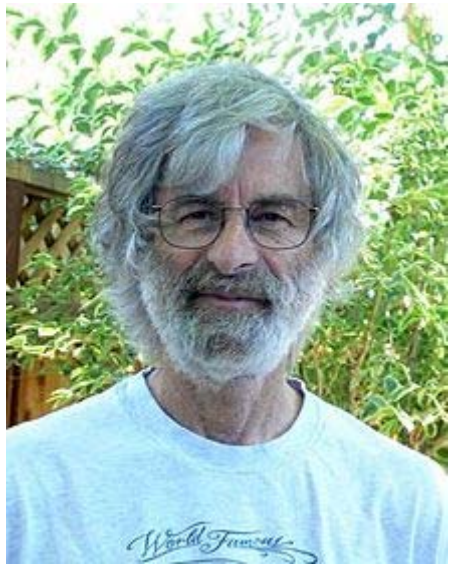
Latex起源

1977年，Knuth 教授写The Art of Computer Programming的第四卷时，发现出版商把他书中的数学公式排版得很难看，决定自行开发一个适合排数学公式的排版系统，于是就有了Latex的前身TEX系统。



Latex起源

- TEX 是一种低级的排版语言，Knuth教授为此写了一组宏命令(Macro)，称为Plain TEX。
- 1985年，Leslie Lamport写了另外一组宏命令，即Latex。



The winner of the 2013 Turing Award

LaTeX 安装

Starting with TEX, LATEX

- **Get a distribution**

You first need a collection of the software. Such a collection is called a distribution (Tex System), and comes with Tex, Latex and BIBTEX.

Windows:

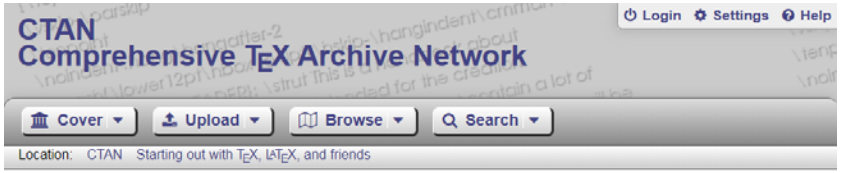
The most popular choice is MiKTEX. Many people advise beginners to get the proTEXt bundling of MiKTEX.

Unix/Linux:

The best choice is TEX Live, which contains many packages and programs. Most Unix systems have TEX as an installation option so you might already have it.

Macintosh:

Get the MacTEX distribution, which is TEX Live with some Mac-specific goodies.



https://www.ctan.org/starter

安装

1. Latex distribution (Tex system): MikTex, proText, Texlive 等

2. 编辑器：Texmaker, WinEdit, TexWorks 等

例：

- 安装MikTex https://miktex.org/download

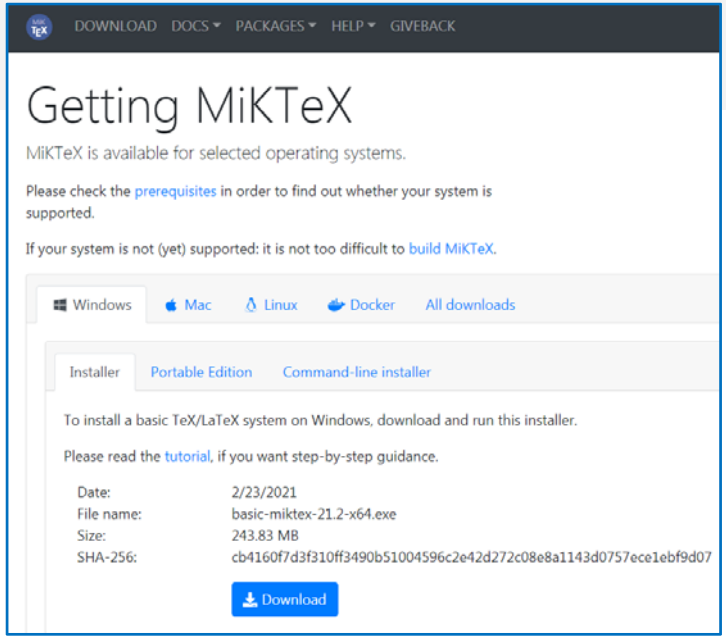
  下载并安装：basic-miktex-21.2-x64.exe

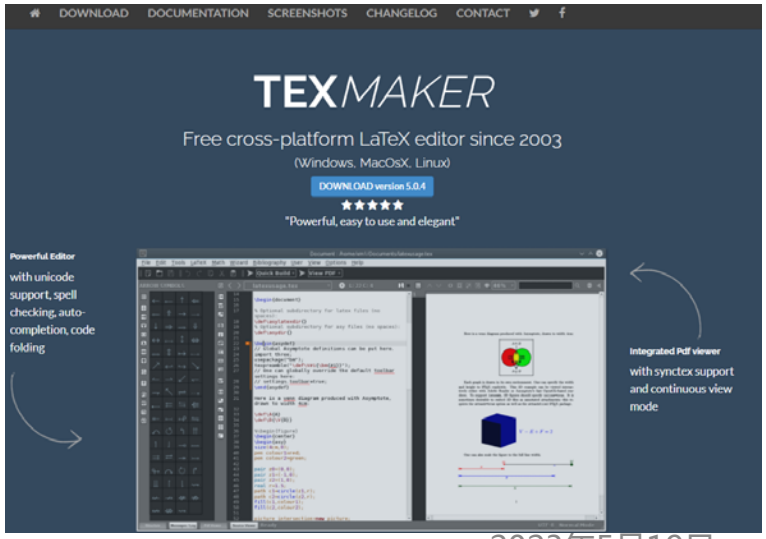
- 安装Texmaker https://www.xm1math.net/texmaker/

  下载并安装：Texmaker_5.0.4_Win_x64.msi

✓ 若使用中文，在前置区中加入命令：

\usepackage [UTF8]{ctex}





Latex distribution: **TeX Live**

TeX Live is intended to be a straightforward way to get up and running with the TeX document production system. It provides a comprehensive TeX system with binaries for most flavors of Unix, including GNU/Linux, macOS, and also Windows. It includes all the major TeX-related programs, macro packages, and fonts that are free software, including support for many languages around the world.

By the way, if you don't care for TeX Live's setup for whatever reason, the major (free software) alternative is MiKTeX, which also runs on GNU/Linux, macOS, and Windows.

https://www.tug.org/texlive/

Latex distribution: **MiKTeX**

MiKTeX is a modern TeX distribution for Windows, Linux and macOS.

MiKTeX's integrated package manager installs missing components from the Internet, if required. 自动下载宏包。

MiKTeX

https://miktex.org/

Latex 编辑器

LaTeX Editors are a document preparation system. It offers various features that are designed for producing scientific and technical documents. Many such tools have a built-in PDF viewer to see the output.

These applications allow you to insert tables, images, mathematical symbols, and more. You can also use these programs to make documents in collaboration with others.

Comparison of TeX editors

https://en.wikipedia.org/wiki/Comparison_of_TeX_editors

Latex 编辑器: Texmaker

Texmaker is a free, modern and cross-platform LaTeX editor for **linux**, **macosx** and **windows** systems that integrates many tools needed to develop documents with LaTeX, in just one application. **Texmaker** includes unicode support, spell checking, auto-completion, code folding and a built-in pdf viewer with synctex support and continuous view mode.

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

Latex 编辑器: WinEdt

Home | News | About WinEdt | Downloads | Installing | Support | Registration | Snapshots | WinEdt.org | Contact

WinEdt 10

Created with WinEdt™

WinEdt is a powerful and versatile all-purpose text editor for Windows with a strong predisposition towards the creation and compilation of LaTeX documents...

WinEdt is used as a front-end *(Integrated Development Environment)* for compilers and typesetting systems, such as TeX, HTML or NSIS. WinEdt's highlighting schemes can be customized for different modes and its spell checking functionality supports multilingual setups, with dictionaries (word lists) for many languages available on WinEdt's Community Site www.winedt.org. *Contributions are welcome!*

Although reasonably suitable as an all-purpose text editor, WinEdt has been specifically designed and configured to integrate seamlessly with a TeX System (such as MiKTeX or TeX Live). However, WinEdt's documentation does not cover TeX-related topics in depth; you'll find introductions and manuals on typesetting with TeX, as well as links to other recommended accessories, on TeX's Community Site (TUG). For LaTeX-related issues visit LaTeX Community Forum: questions are welcome and help is forthcoming!

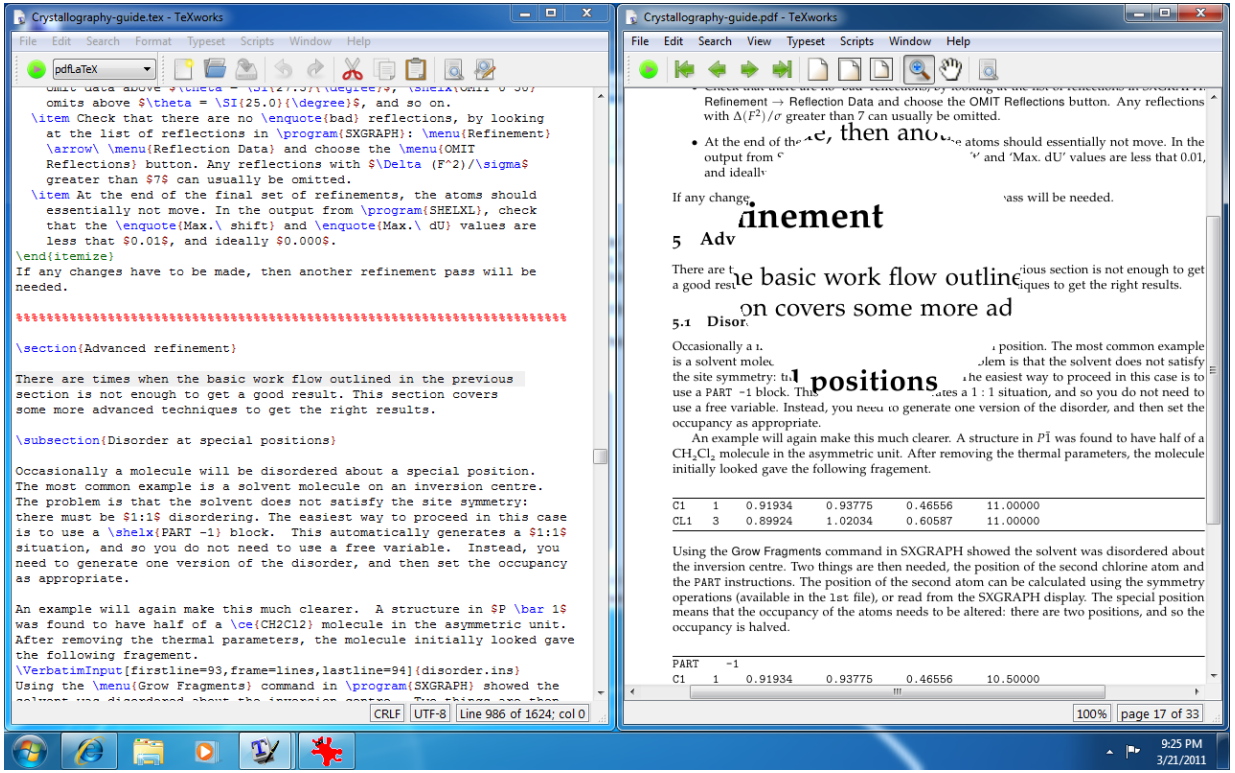
---

https://www.winedt.com/index.html

License description	Educational	Business/Govt	Student
Personal License	US $60	US $100	US $40

Latex 编辑器: TeXworks

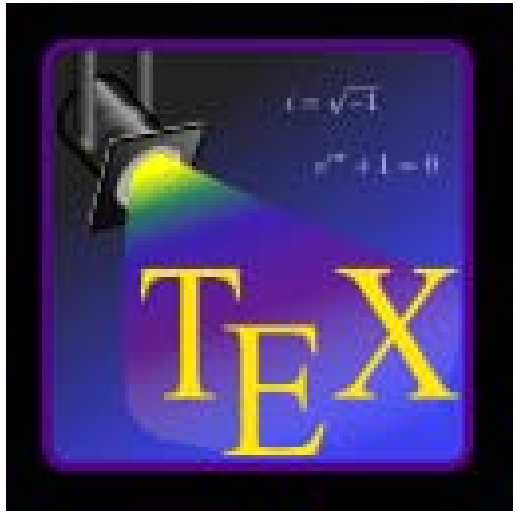
- The TeXworks project is an effort to build a simple TeX front-end program (working environment) that will be available for all today's major desktop operating systems—in particular, MS Windows (7/8/8.1/10), typical GNU/Linux distros and other X11-based systems, as well as macOS.
- Note that TeX Live (since version 2009) and MiKTeX (since version 2.8) both include TeXworks for MS Windows.



http://www.tug.org/texworks/

Latex 编辑器: TeXstudio

TeXstudio is an integrated writing environment for creating LaTeX documents. TeXstudio has numerous features like syntax-highlighting, integrated viewer, reference checking, and various assistants.



https://www.texstudio.org/

LATEX 文档

- Get documentation

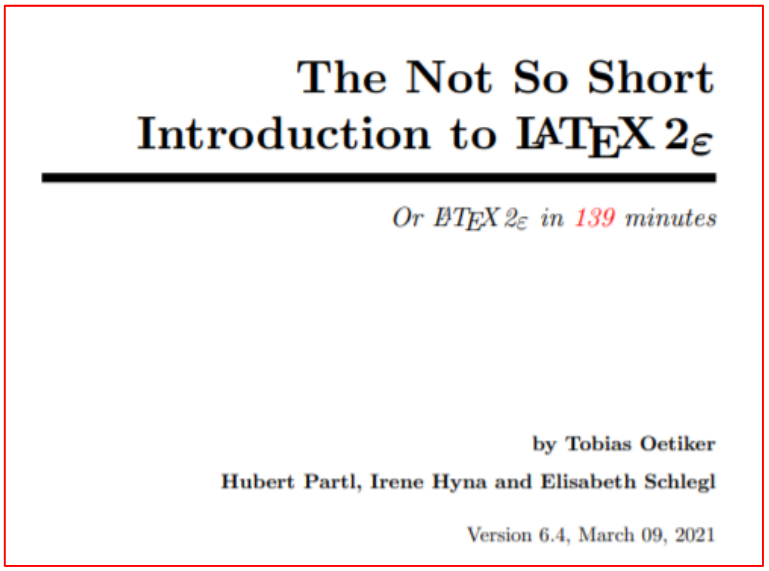
Most people starting TEX today use the LATEX macro package. The most-often recommended tutorial is the (Not So) Short Guide to LATEX2ε. Another tutorial is the Indian TEX group's LATEX primer.

Many people get a TEX system **to write mathematical text**. For that, get the documentation for the American Mathematical Society's AMS-LATEX package.

You might also be interested in a comprehensive list of symbols and a tutorial on graphics.

https://www.ctan.org/starter

LATEX 文档



The Not So Short Introduction to LaTeX 2ε

Or LaTeX 2ε in 139 minutes

by Tobias Oetiker

Hubert Partl, Irene Hyna and Elisabeth Schlegl

Version 6.4, March 09, 2021

https://mirrors.concertpass.com/tex-archive/info/lshort/english/lshort.pdf

一份（不太）简短的 LaTeX 2ε 介绍

或 112 分钟了解 LaTeX 2ε

英文作者： Tobias Oetiker

Hubert Partl, Irene Hyna and Elisabeth Schlegl

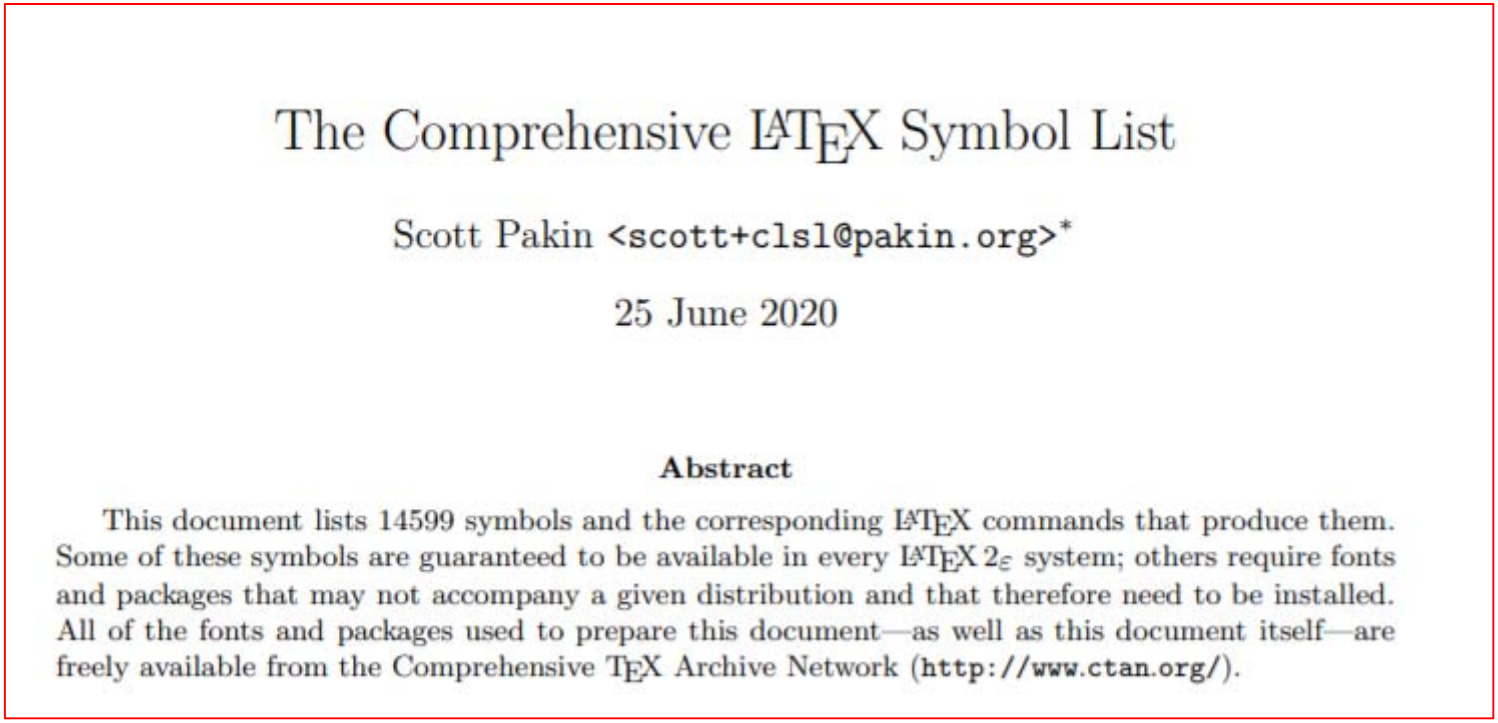
英文版本： Version 6.2, Februrary 28, 2018

中文翻译： CTeX 开发小组

中文版本： 版本 6.02，二零二零年八月

https://mirror.las.iastate.edu/tex-archive/info/lshort/chinese/lshort-zh-cn.pdf

LATEX 文档



The Comprehensive LaTeX Symbol List

Scott Pakin <scott+clsl@pakin.org>*

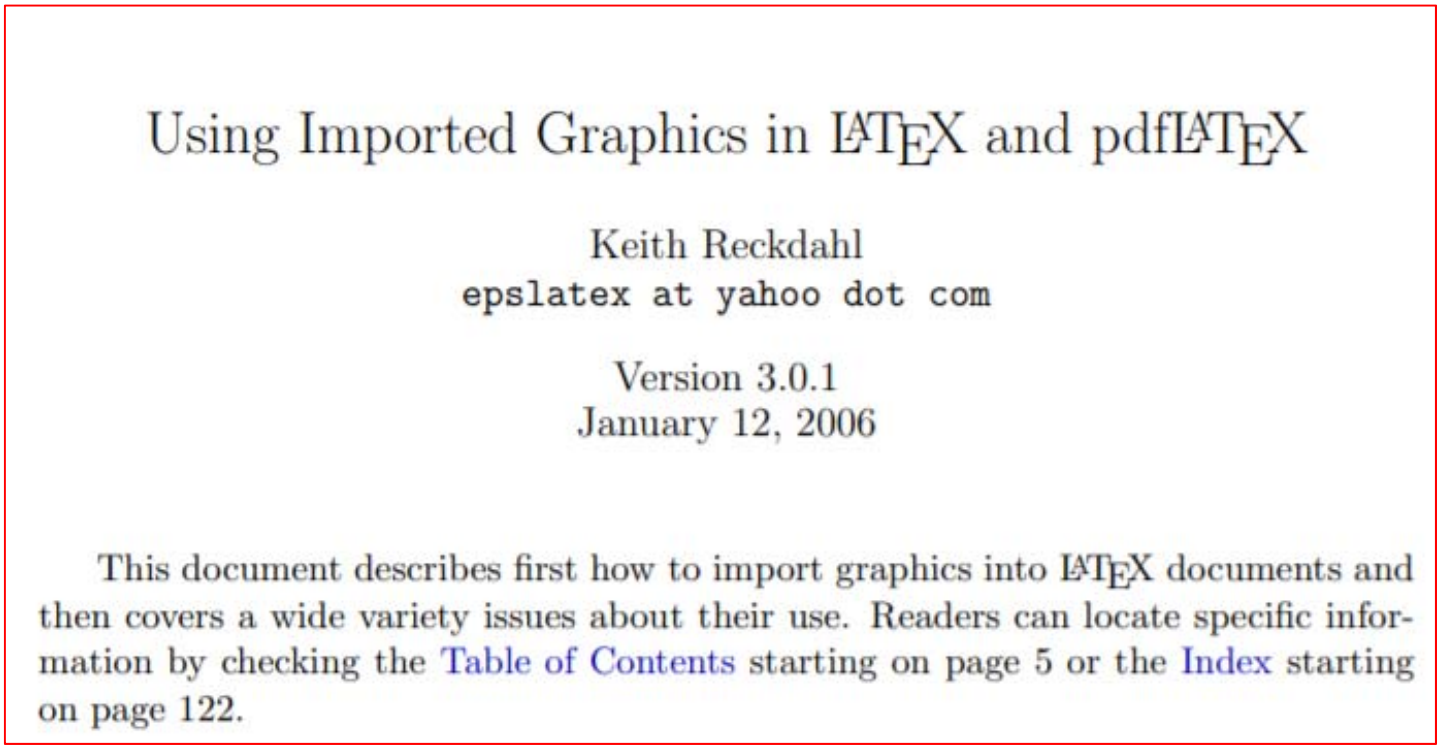
25 June 2020

Abstract

This document lists 14599 symbols and the corresponding LaTeX commands that produce them. Some of these symbols are guaranteed to be available in every LaTeX 2_ε system; others require fonts and packages that may not accompany a given distribution and that therefore need to be installed. All of the fonts and packages used to prepare this document—as well as this document itself—are freely available from the Comprehensive TeX Archive Network (http://www.ctan.org/).

http://tug.ctan.org/info/symbols/comprehensive/symbols-a4.pdf

LATEX 文档



Using Imported Graphics in LaTeX and pdfLaTeX

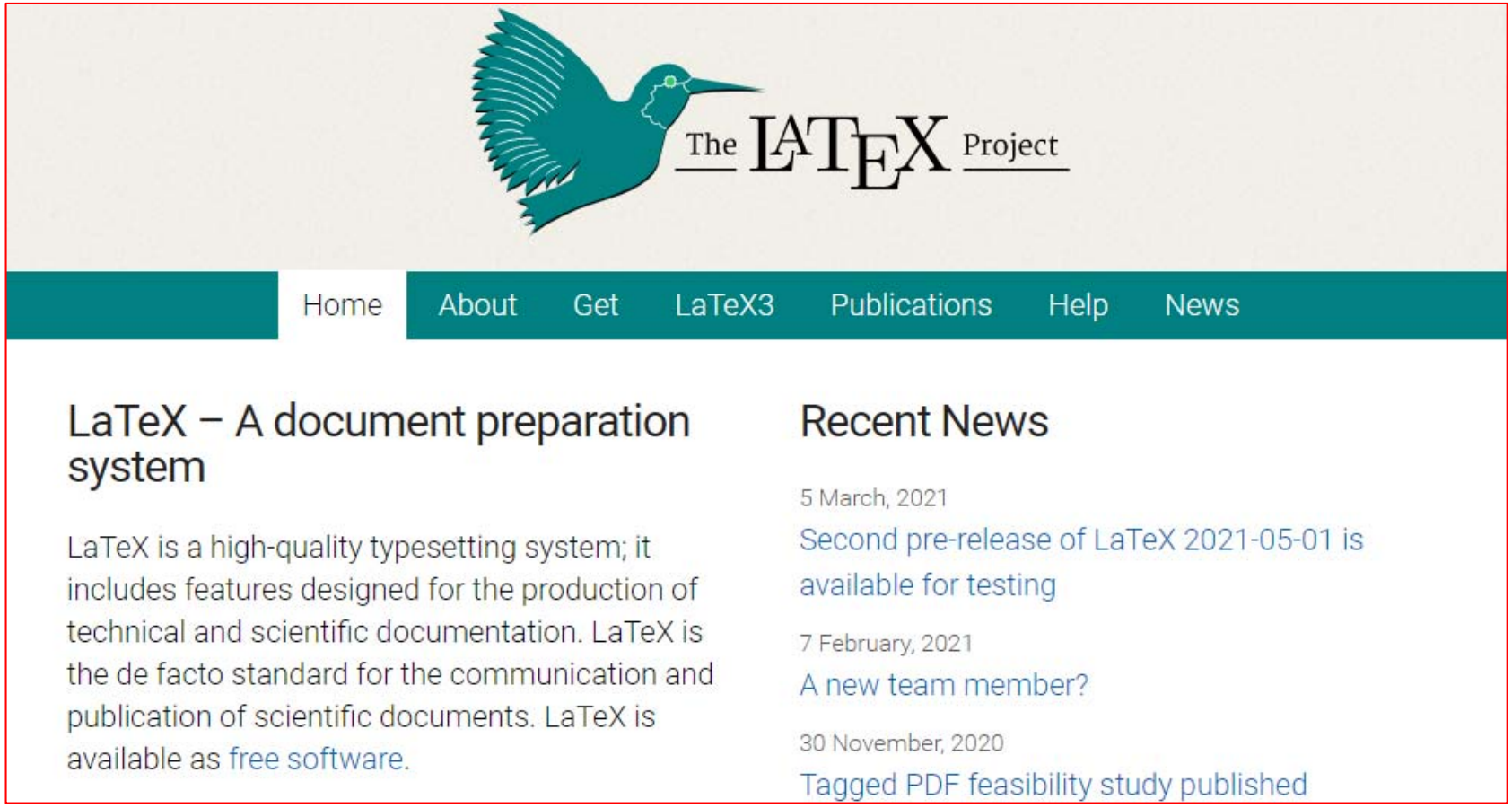
Keith Reckdahl
epslatex at yahoo dot com

Version 3.0.1
January 12, 2006

This document describes first how to import graphics into LaTeX documents and then covers a wide variety issues about their use. Readers can locate specific information by checking the Table of Contents starting on page 5 or the Index starting on page 122.

https://mirror.las.iastate.edu/tex-archive/info/epslatex/english/epslatex.pdf

Latex 资源

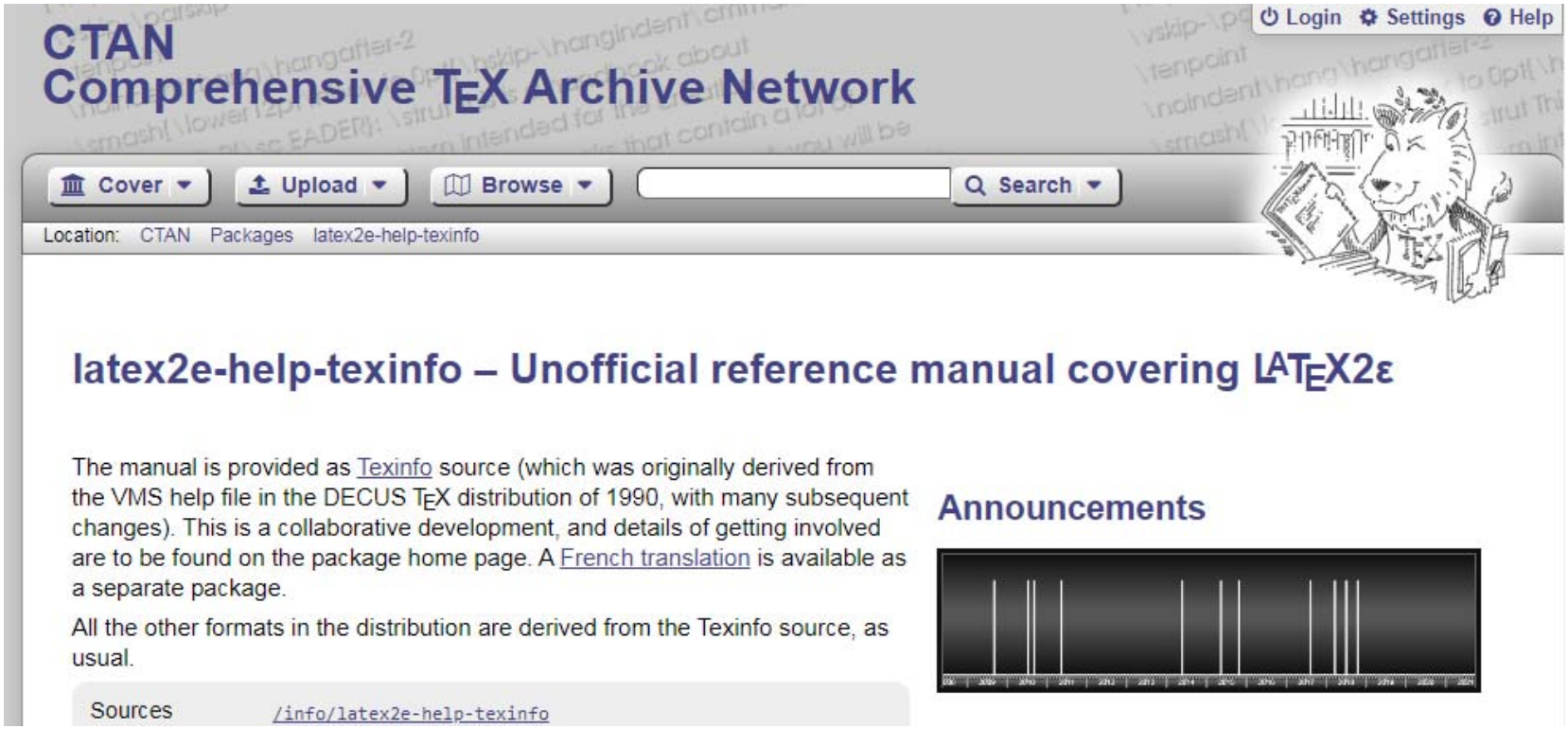


https://www.latex-project.org/

Latex 资源

https://www.ctan.org/

Latex 资源



https://ctan.org/pkg/latex2e-help-texinfo

Contained in TEX Live as latex2e-help-texinfo, MiKTEX as latex2e-help-texinfo

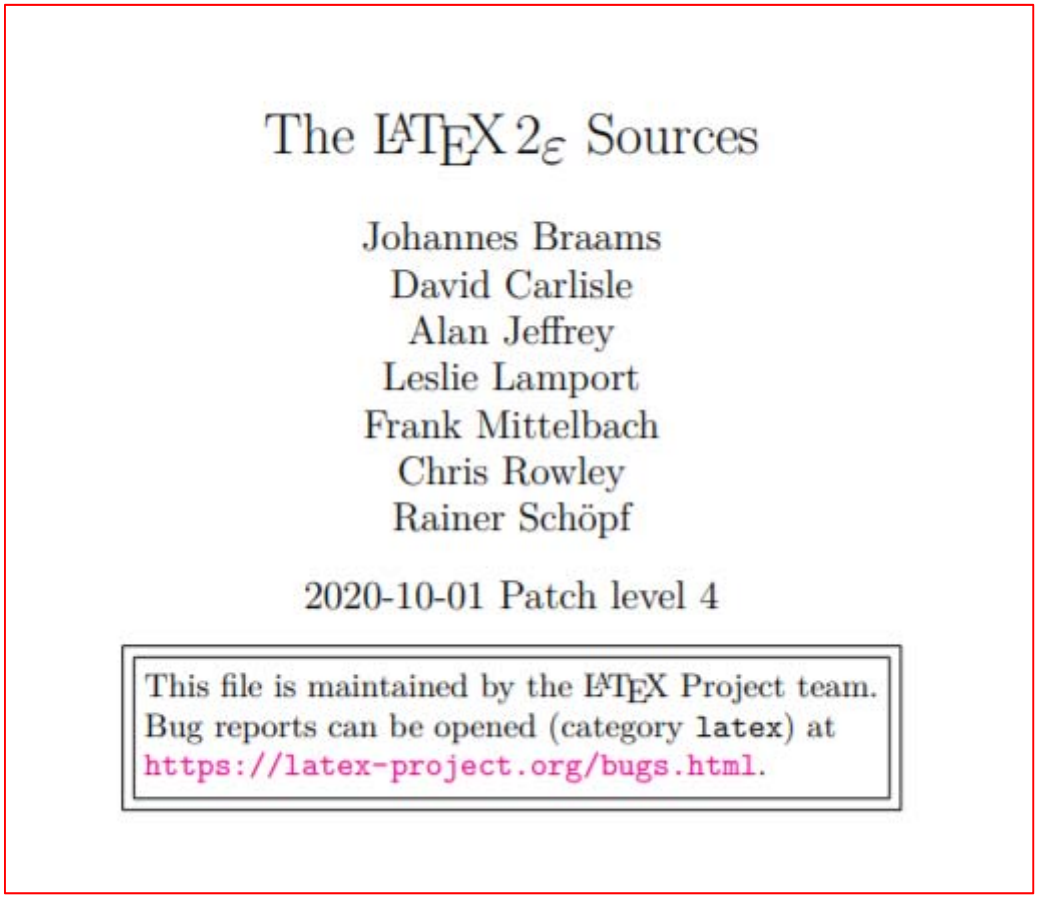
Latex 资源

LaTeX2e unofficial reference manual (October 2018)

Short Table of Contents

https://mirrors.rit.edu/CTAN/info/latex2e-help-texinfo/latex2e.html

Latex 资源



The LaTeX 2_ε Sources

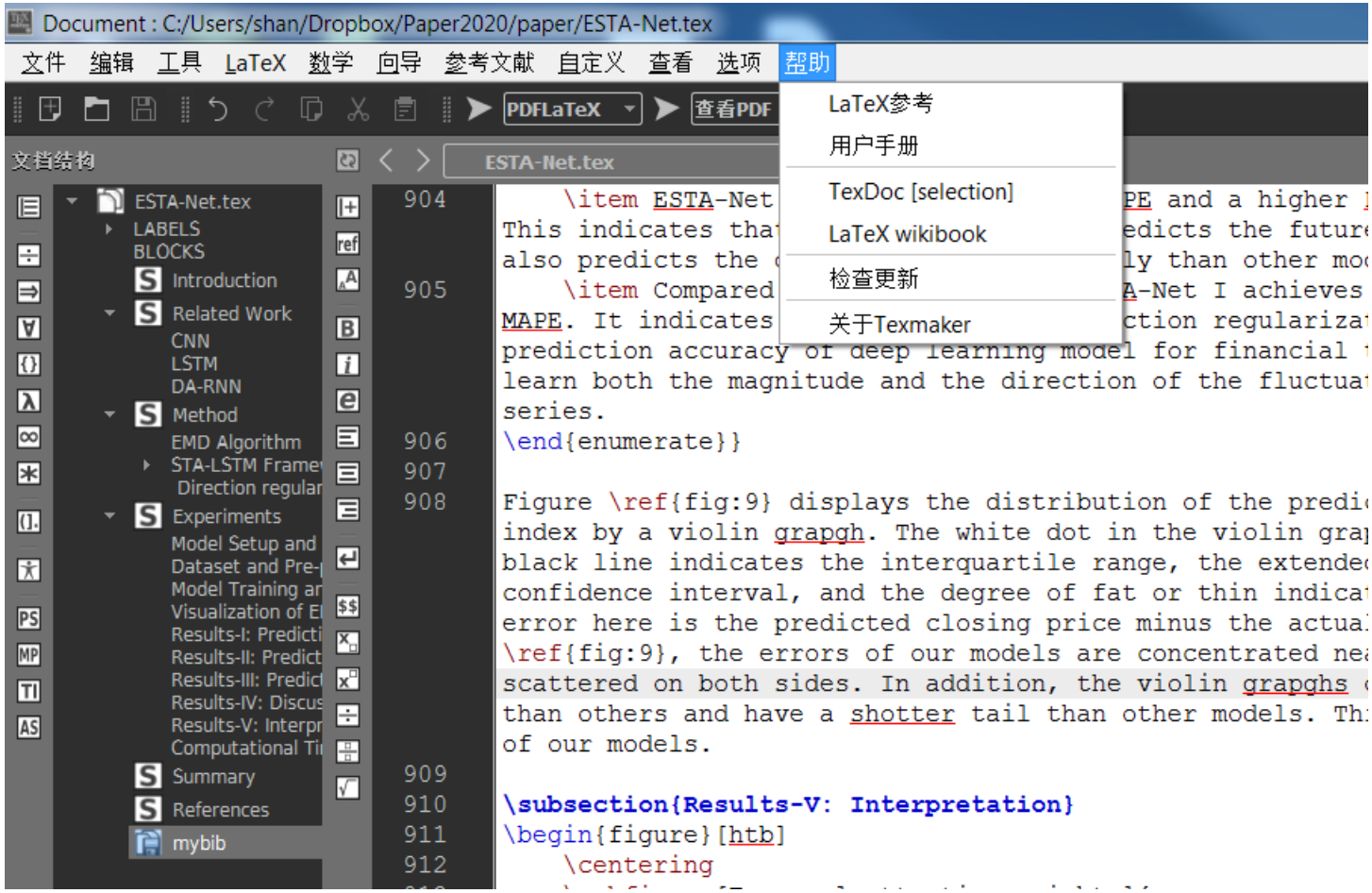
Johannes Braams
David Carlisle
Alan Jeffrey
Leslie Lamport
Frank Mittelbach
Chris Rowley
Rainer Schöpf

2020-10-01 Patch level 4

This file is maintained by the LaTeX Project team.
Bug reports can be opened (category `latex`) at
https://latex-project.org/bugs.html.

http://tug.ctan.org/tex-archive/macros/latex2e/base/source2e.pdf

Latex 资源


Document : C:/Users/shan/Dropbox/Paper2020/paper/ESTA-Net.tex
文件 编辑 工具 LaTeX 数学 向导 参考文献 自定义 查看 选项 帮助
PDFLaTeX
查看PDF
LaTeX参考
用户手册
TexDoc [selection]
LaTeX wikibook
检查更新
关于Texmaker
文档结构
ESTA-Net.tex
LABELS
BLOCKS
Introduction
Related Work
CNN
LSTM
DA-RNN
Method
EMD Algorithm
Experiments
Summary
References
mybib
904
905
906
907
908
909
910
911
912
\item ESTA-Net
This indicates tha
also predicts the
\item Compared
MAPE. It indicates
prediction accuracy of deep learning model for financial
learn both the magnitude and the direction of the fluctua
series.
\end{enumerate}}
Figure \ref{fig:9} displays the distribution of the predi
index by a violin grapgh. The white dot in the violin gra
black line indicates the interquartile range, the extende
confidence interval, and the degree of fat or thin indica
error here is the predicted closing price minus the actua
\ref{fig:9}, the errors of our models are concentrated nea
scattered on both sides. In addition, the violin grapghs
than others and have a shotter tail than other models. Th
of our models.
\subsection{Results-V: Interpretation}
\begin{figure}[htb]
\centering

LaTeX使用(基础)

一个简单的Latex实例

```
% example1.tex
\documentclass{report}
\begin{document}
This is my first {\LaTeX} typesetting example.\\
This is my first \LaTeX{} typesetting example.\\
This is my first \LaTeX\ typesetting example.\\
I am Mr. Edward G.J. Lee, G.J. is a abbreviation of my name.\\
I am Mr.\ Edward G.J. Lee, G.J. is a abbreviation of my name.\\
Please see Appendix A. We will be there soon.\\
Please see Appendix A\null. We will be there soon.
\end{document}
```

Latex语法概述

- Latex文稿

Latex文件：后缀为 .tex

为纯文字文档，可以用任何编辑器编辑。

Latex排版命令

Latex特殊专用符号

1. \ ： 排版指令由 “\” 开头；
2. % ： 注解。
3. $：进入、离开数学模式
4. { } ： 命令作用范围；
5. ～：产生一个空白；
6. \\ ： 换行。

{\LaTeX}

LATEX

例如：

This is my first \LaTeX~ typesetting example.

编译后：

This is my first LATEX typesetting example.

- \LaTeX: 为Latex的一个指令，用于显示LaTeX。
- Latex文稿中，空一个和多个空白都会被认为一个英文空白；
- Latex用空白行来分隔各个段落，但是空一行和多行都认为是一个空白行。

Latex 基本文本结构

```
\documentclass{article}

Preamble区

\begin{document}

文本区

\end{document}
```

说明：

1) \documentclass{article}告诉Latex使用哪种文章类型；

2) Preamble区一些会影响整个文章的指令或者宏命令集。

文章类型

\documentclass [options]{class}

常用class： article, report, book
常用options： 10pt, a4paper, twocolumn

例：

\documentclass [11pt, twocolumn, a4paper]{article}

- To produce a document as an article with a base font size of 11 points, and a two column layout on A4 paper.

\documentclass [12pt, a4paper, oneside, draft]{report}

- To typeset the document as a report to be in 12pt type on A4, but printed one-sided in draft mode

Document Classes

article	For articles in scientific journals, presentations, short reports, program documentation, invitations, ...
IEEEtran	For articles with the IEEE Transactions format.
proc	A class for proceedings based on the article class.
report	For longer reports containing several chapters, small books, thesis, ...
book	For real books.
slides	For slides. The class uses big sans serif letters.
memoir	For changing sensibly the output of the document. It is based on the book class, but you can create any kind of document with it
letter	For writing letters.
beamer	For writing presentations.

Document Class Options

10pt, 11pt, 12pt,…	Sets the size of the main font in the document. If no option is specified, 10pt is assumed.
a4paper, letterpaper,...	Defines the paper size. The default size is letterpaper;
fleqn	Typesets displayed formulas left-aligned instead of centered.
leqno	Places the numbering of formulas on the left hand side instead of the right.
titlepage, notitlepage	Specifies whether a new page should be started after the document title or not. The article class does not start a new page by default, while report and book do.
twocolumn	Instructs LaTeX to typeset the document in two columns instead of one.
twoside, oneside	Specifies whether double or single sided output should be generated. The classes article and report are single sided and the book class is double sided by default.
landscape	Changes the layout of the document to print in landscape mode.
openright, openany	Makes chapters begin either only on right hand pages or on the next page available. This does not work with the article class, as it does not know about chapters. The report class by default starts chapters on the next page available and the book class starts them on right hand pages.
draft	makes LaTeX indicate hyphenation and justification problems with a small square in the right-hand margin of the problem line so they can be located quickly by a human. It also suppresses the inclusion of images and shows only a frame where they would normally occur.

Preamble区

Preamble区

文本区

```
\documentclass{article}
\usepackage{color}    %  The color package which will be  used in the article.
\linespread{1.36}     % 将行距变成原来的1.36 倍
\parindent=0pt        % 调整段落内缩的程度，这里调整成0
\begin{document}
This is blue color.\\
\textcolor{blue}{This is blue color.}
\end{document}
```

编译结果：

This is blue color.

This is blue color.

文本区

- 环境

\begin{环境名称}

…

\end{环境名称}

\begin{document}

…

\end{document}

说明：指令间文稿都会起作用。整篇LATEX 文稿的内容，就是包含在一个\begin{document} 和\end{document} 的document环境中。

文档结构

- 章节标题由指令控制，不必理会字型、大小，Latex会自动处理。
- 章节标题内容直接写入指令的大括号里。
- Book/report: 深度标号2； article：深度标号为3

深度标号	指令	作用
-1	\part{}	部，最大结构
0	\chapter{}	章，article文章里无章
1	\section{}	节
2	\subsection{}	小节
3	\subsubsection{}	次小节
4	\paragraph{}	段落
5	\subparagragh{}	小段落

深度可调节。在preamble区中 % let the depth of report to subsubsection

\setcounter{secnumdepth}{3}

加入章节标题

```
% example2.tex
\documentclass{report}
\begin{document}
    This is the first experience of \LaTeX.
    \chapter{Aesop Fables}
    \section{The Ant and the Dove}
    An ant went to the bank of a river ...
    \section{The Dog in the Manger}
    A dog lay in a manger, and by his growling...
    \chapter{The Eagle and the Arrow}
    An eagle sat on a lofty rock,...
\end{document}
```

注：

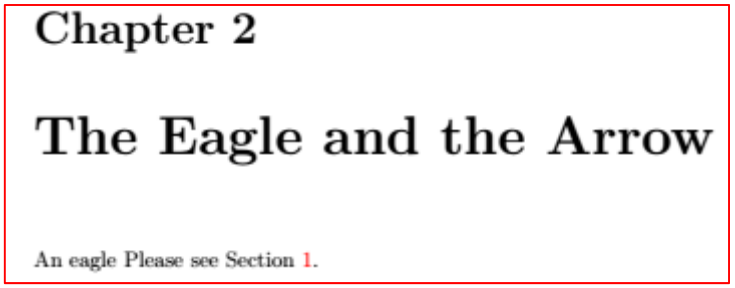
1. Report类别，新的一章(Chapter)会换页；

2. Article 类别，无Chapter，将\Chapter{}换成\section{}，原来的\section换成\subsection，并看结果；

3. 将Article换成book，再看结果。

章节标题与交叉引用

```
% example2.tex
\documentclass{report}
\usepackage[colorlinks=true]{hyperref}
\begin{document}
    This is the first experience of \LaTeX.
    \chapter{Aesop Fables}\label{Ch:1}
    \section{The Ant and the Dove}
    An ant went to the bank of a river ...
    \section{The Dog in the Manger}
    A dog lay in a manger, and by his growling...
    \chapter{The Eagle and the Arrow}
    An eagle... Please see Section \ref{Ch:1}.
\end{document}
```

Chapter 2

The Eagle and the Arrow

An eagle Please see Section 1.

加入title page

```
% example3.tex

\documentclass{report}
    \title{Aesop Fables}
    \author{Aesop\thanks{Thanks to the reader.}
                \and Nobody\thanks{Thanks to nobody.}}
    \date{\today}
\begin{document}
    \maketitle
    This is the first experience of \LaTeX.
    \chapter{Aesop Fables}
    \section{The Ant and the Dove}
\end{document}
```

1) title page: 包括title, author, date, thanks；若无\maketitle就没有title page 。

2) 在report/book中, title page自成一页；在article中，title page 和文本连在一起；

3) 要修改的地方是preamble 区及文本区的\maketitle

4) title page不编码。

5）作者用\and 指令连接。若没有\date{\today}指令，日期固定为今天。

加入目录

```
% example4.tex
\documentclass{report}
\title{Aesop Fables}
\author{Aesop\thanks{Thanks to the reader.}
\and Shan\thanks{Thanks to Kevin.}}
\date{\today}
\begin{document}
\maketitle
\tableofcontents
This is the first experience of \LaTeX.
\section{Aesop Fables}
\section{The Ant and the Dove}
\end{document}
```

1) \tableofcontents 要加在\maketitle 的后，否则目录会印在title page 之前。

2) 要编译2次，产生example4.toc，再真正加入目录。目录顺序：List of Figures, List of Tables .

加入摘要

```
% example5.tex
\documentclass{report}
\title{Aesop Fables}
\author{Aesop\thanks{Thanks to the reader.}
\and Nobody\thanks{Thanks to nobody}}
\date{\today}
\begin{document}
\maketitle
\begin{abstract}
  The tale, the Parable, and the Fable are all
  common and popular modes of conveying
  instruction. Each is distinguished by its own
  special characteristics.
\end{abstract}
\tableofcontents
\chapter{Aesop Fables}
\section{The Ant and the Dove}
\end{document}
```

注：

abstract只有article/report才有，report 的摘要自成一页，不编页码，且不会放入目录；article 的摘要和正文相连，在文章标题后。

加入脚注

- Footnote，marginalnote
- 脚注由阿拉伯数字编号，至于页底。
- report/book 类，编号每章会从头算起，article 则会连续。

脚注（Footnote）

```
% example6.tex
\documentclass{report}
\title{Aesop Fables}
\author{Aesop\thanks{Thanks to the reader.}
\and Nobody\thanks{Thanks to nobody}}
\date{\today}
\begin{document}
\maketitle
\tableofcontents
This is the first experience of \LaTeX.
\chapter{Aesop Fables}
\section{The Ant and the Dove}
An ant...
A Dove\footnote{Pigeon, an emblem of peace.}
sitting on a...
\end{document}
```

使用\footnote{} 指令即可，文字放于括号内

边注（Marginal note）

```
% example7.tex
\documentclass{report}
\title{Aesop Fables}
\author{Aesop\thanks{Thanks to the reader.} \and
Nobody\thanks{Thanks to nobody}}
\date{\today}
\begin{document}
    \maketitle
    \tableofcontents
    This is the first experience of \LaTeX.
    \chapter{Aesop Fables}
    \section{The Ant and the Dove}
    An ant went to the bank of a river to quench its
    thirst, and being carried away by the rush of the
    stream, was on the point of drowning.
    A Dove\marginpar{Pigeon, an emblem of peace.}
\end{document}
```

字型调整

- 字族（font family）

  默认为Knuth 教授所设计的Computer Modern fonts。

  例：cmr Computer Modern Roman； cmss Computer Modern Sans Serif； cmtt Computer Modern Typewriter

- 字型系列（font series）

  字型的weight（胖瘦）及width（长扁）。例如粗、细字体，一般用medium，粗体是bold。

  m： medium； b: bold； bx: Bold extended； sb: Semi-bold； c: Condensed

- 字形（font shape）：字的形状。

  n : 正常字（normal），指upright; it Italic sl Slanted sc Small Caps

- 字型大小（font size）

  预设10pt（10 point）

字型调整

字形	textup	\textup{textup}	{\upshape textup}	
	italic	\textit{italic}	{\itshape italic}	{\it italic}
	slant	\textsl{slant}	{\slshape slant}	{\sl slant}
	SMALL CAPS	\textsc{small caps}	{\slshape small caps}	{\sc small caps}
系列	medium	\textmd{medium}	{\mdseries medium}	
	boldface	\textbf{boldface}	{\bfseries boldface}	{\bf boldface}
字族	roman	\textrm{roman}	{\rmfamily roman}	{\rm roman}
	sans serif	\textsf{sans serif}	{\sffamily sans serif}	{\sf sans serif}
	typewriter	\texttt{typewriter}	{\ttfamily typewriter}	{\tt typewriter}

也可当成环境来用，如\begin{itsahpe}，\end{itshape}，\itshape，以后文字都用italic，直至另一个改变字型的指令出现

字型调整

```
% example8.tex
\documentclass{report}
\title{\bfseries Aesop Fables}
\title{Aesop Fables}
\author{Aesop\thanks{Thanks to the reader.}
\and Shan\thanks{Thanks to Kevin.}}
\date{\today}
\begin{document}
\section{The \textsl{Ant} and the \textsl{Dove}}
\itshape
An ant went
\upshape
A \textsl{Dove} sitting on a her. The \textbf{\textsl{Ant}} climbed
\section{The {\it Dog}\/ in the Manger}
A \textbf{\textit{dog}} lay in a manger
\chapter{The \textsc{Eagle} and the Arrow}
An \textsc{eagle} sat on a who saw the \textsc{Eagle} from
\end{document}
```

注：

{\it Dog}\/ in the...}？\/ 是调整斜体字（包括italic 及slanted）和正常字之间的空白。

建议用LATEX 的第一标准指令来改字型。使用{\it ...} 或{\itshape ...} 得注意italic correction 的问题。

相对字型大小的调整

10pt时各种字型大小指令、实际例子、及其大小；

\tiny	{\tiny tiny}	tiny	5pt
\scriptsize	{\scriptsize scriptsize}	scriptsize	7pt
\footnotesize	{\footnotesize footnotesize}	footnotesize	8pt
\small	{\small small}	small	9pt
\normalsize	{\normalsize normalsize}	normalsize	10pt
\large	{\large large}	large	12pt
\Large	{\Large Large}	Large	14.4pt
\LARGE	{\LARGE LARGE}	LARGE	17.28pt
\huge	{\huge huge}	huge	20.74pt
\Huge	{\Huge Huge}	Huge	24.88pt

```
\begin{small}
    文字
\end{small}
```

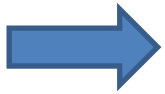
纸张大小

```
% 纸张设定
\documentclass[12pt,a4paper]{report}
```

a4paper	21x29.7cm	letterpaper	8.5x11in
a5paper	14.8x21cm	legalpaper	8.5x14in
b5paper	17.6x25cm	executivepaper	7.25x10.5in

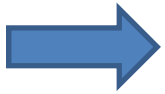
项目标签环境(item label)

项目式条列环境(itemize)



- 第一大项，这是第一大项。
- 第二大项，这是第二大项。
  - 第一小项，这是第一小项。
  - 第二小项，这是第二小项。
- 第三大项，这是第三大项。
- 第四大项，这是第四大项。

枚举环境环境(enumerate)



1. 第一大项，这是第一大项。
2. 第二大项，这是第二大项。
   (a) 第一小项，这是第一小项。
   (b) 第二小项，这是第二小项。
3. 第三大项，这是第三大项。
4. 第四大项，这是第四大项。

条列环境(description)

第一大项，这是第一大项。

第二大项，这是第二大项。

第一小项 ，这是第一小项。

第二小项 ，这是第二小项。

第三大项 ，这是第三大项。

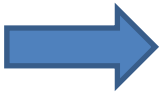
第四大项 ，这是第四大项。

项目式条列环境（itemize）

```
\documentclass[10pt]{article}
\usepackage[UTF8]{ctex}
\begin{document}

\begin{itemize}
\item 第一大项，这是第一大项。
\item 第二大项，这是第二大项。
    \begin{itemize}
    \item 第一小项，这是第一小项。
    \item 第二小项，这是第二小项。
    \end{itemize}
\item 第三大项，这是第三大项。
\item 第四大项，这是第四大项。
\end{itemize}

\end{document}
```



- 第一大项，这是第一大项。
- 第二大项，这是第二大项。
  - 第一小项，这是第一小项。
  - 第二小项，这是第二小项。
- 第三大项，这是第三大项。
- 第四大项，这是第四大项。

enumerate 环境

```
\documentclass[10pt]{article}
\usepackage[UTF8]{ctex}
\begin{document}

\begin{enumerate}
\item 第一大项，这是第一大项。
\item 第二大项，这是第二大项。
    \begin{enumerate }
    \item 第一小项，这是第一小项。
    \item 第二小项，这是第二小项。
    \end{enumerate }
\item 第三大项，这是第三大项。
\item 第四大项，这是第四大项。
\end{enumerate }

\end{document}
```

将上页命令中itemize
改为 enumerate

1. 第一大项，这是第一大项。
2. 第二大项，这是第二大项。
    (a) 第一小项，这是第一小项。
    (b) 第二小项，这是第二小项。
3. 第三大项，这是第三大项。
4. 第四大项，这是第四大项。

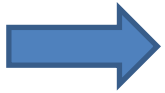
条列环境(description)

```
\documentclass[10pt]{article}
\usepackage[UTF8]{ctex}
\begin{document}

\begin{description}
\item 第一大项，这是第一大项。
\item 第二大项，这是第二大项。
    \begin{description}
    \item [第一小项]，这是第一小项。
    \item [第二小项]，这是第二小项。
    \end{description}
\item [第三大项]，这是第三大项。
\item [第四大项]，这是第四大项。
\end{description}

\end{document}
```

改成description，文字用方括号括住，则以粗体文字来起头



第一大项，这是第一大项。

第二大项，这是第二大项。

第一小项 ， 这是第一小项。

第二小项 ， 这是第二小项。

第三大项 ， 这是第三大项。

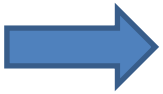
第四大项 ， 这是第四大项。

tabular表格

```
\documentclass[10pt]{article}
\begin{document}

\begin{tabular}[t]{lll}
\hline
column1 & column2 & column3 \\
\hline
item1 & item2 & item3 \\
itemA & itemB & itemC \\
\hline
\end{tabular}

\end{document}
```



column1	column2	column3
item1	item2	item3
itemA	itemB	itemC

- [t] 表示top，[b] 表示bottom，[c] 代表center；
- 111指定各列内容在小方框内的置放位置，l 标示靠左（left），r 表示靠右（right），c 表示置中（center） 。在{l l l} 中加上bar（|）会画纵线，例如{|l|l|l|} 就变成传统的大方框、小方框表格。而两个bar 就会画双纵线。
- \hline 画一横线，\hline\hline 画双横线；。
- 最常用，作为一个整体处理，不能被分割。
- 有表格线，列间符号是&，要指定列内文字的位置。

tabular表格调整

1.p{宽度}：指定列宽，指定了宽度后，里面文字自动换行。

2.@{文字、符号或指令}：让指定列各行都出现某个文字、符号或都在某个指令作用下。置于首尾的话，会让横线和文字切齐（预设不对齐，横线两端会多出栏位位间距的部份）。@{} 如无参数，作用是去掉两列多余表格线。

3.\multicolumn{列}{左右位置}{文字内容}：跨列排版，例如一小段文字跨两列。左右位置可使用l r c 之一。

4.\cline{a-b}：a-b 指的是要画横线的列数，例如\cline{2-3} 就是画第二列至第三列的横线。

5.\arrayrulewidth：调整表格线条的粗细，预设为0.4pt。使用方法：\arrayrulewidth=1.5pt 即可，要注意在进入tabular环境前设好。

6.\tabcolsep：调整两列间距。所设指是实际列间距一半，预设是6pt。使用方法和 \arrayrulewidth 一样。

7.\doublerulesep：调整画双线时，两线间间距，预设值是2pt。使用方法和\arrayrulewidth 一样。

8.\arraystretch：调整表格上下行距。这要由\renewcommand来重设，因为在LATEX 定义出的一个常数值，而这个\arraystretch是这些常数值的倍数，需要重新改变他才能改变预设倍数。例如：example16.tex 中的使用方法。

表格浮动环境

```
\begin{table}[置放位置选项] % 进入浮动表格环境
\caption{表格标题}
\begin{tabular}{表格参数}
表格内容
\end{tabular}
\end{table}
```

- tabular 表格，不能被分割，当表较大时LATEX 就会起新页去置放，看起来很不自然。使用浮动环境，LATEX把前后位置经过整体计算，再决定图表应放在哪儿。
- \{caption} 指定表格标题，编译后会自动标上 ‘Table n:’ ，后接caption的内容，n会自动编号。 ① h(here) 置于下指令处 ② t(top) 置于一页的顶端 ③ b(bottom) 置于本页底部，如空间不够会置于次页 ④ p(page) 单独占一页

例：表与引用

```
\documentclass{article}
\usepackage[colorlinks=true]{hyperref}
\usepackage{graphicx}

\begin{document}
\section{Experiment Result}
The proposed method is able to automatically recover a better PSF and reconstruct images of a higher quality according to the Peak Signal to Noise Ratio (PSNR), see Table.\ref{tab:results}.

\begin{table}[htb]
\caption{Experiment Results}
\label{tab:results}
\begin{center}
\begin{tabular}{t}{lll}
\hline
column1 & column2 & column3 \\
\hline
item1 & item2 & item3 \\
itemA & itemB & itemC \\
\hline
\end{tabular}
\end{center}
\end{table}

\end{document}
```

1 Experiment Result

The proposed method is able to automatically recover a better PSF and reconstruct images of a higher quality according to the Peak Signal to Noise Ratio (PSNR), see Table.1.

Table 1: Experiment Results

column1	column2	column3
item1	item2	item3
itemA	itemB	itemC

图形

Latex文档插入图片的方法：

```
\usepackage{graphicx}；    % 用\includegraphics 指令：
...
\begin{document}
...
\begin{figure} % 进入浮动环境
\includegraphics[参数]{图片名称}
...
\caption{标题}
\label{引用标志}
\end{figure}
...
```

includegraphics 指令选项

选项间用逗号隔开

1. Width：图像宽度，会自动伸缩，例如 [width=5in]；[width=0.75\textwidth]
2. Scale：按比例缩放，无单位，缩放倍数。例： [scale=.5]
3. Bb：设定（bounding box），bb=98 98 468 430，左下角坐标是(98, 98)，而右上角坐标是(468, 430)，以纸张的左下角为(0, 0)
4. Clip：修剪图的四周指定边缘。
5. Trim：去除的部份长度。如： \includegraphics[trim=7 7 7 7, clip]{some}除去四周7bp(big point)。图文件尽量不加扩展名。
6. Angle：逆时针旋转角度。例：[angle=90, height=1in]
7. Orgin：旋转中心。
8. Height：图形高度。
9. totalheight：图形总高度，即height 再加上depth 的值。

图片

```
\documentclass[10pt]{article}
\usepackage{graphicx}
\begin{document}
\begin{figure}[hbt]
\centerline{\includegraphics[width=1\textwidth]{1.jpg}}
\caption{Visualization}
\label{fig:Scintist}
\end{figure}
\end{document}
```

例：插图与交叉引用

```
\documentclass{article}
\usepackage[colorlinks=true]{hyperref}
\usepackage{graphicx}

\begin{document}
\section{Experiment Result}
The proposed method is able to automatically recover a better PSF and reconstruct images of a higher quality according to the Peak Signal to Noise Ratio (PSNR), see Fig.\ref{fig:SadScientist}.

\begin{figure}[h]
    \centering
    \includegraphics[width=3in]{1.jpg}
    \caption{SadScientist}
    \label{fig:SadScientist}
\end{figure}

\end{document}
```

1 Experiment Result

The proposed method is able to automatically recover a better PSF and reconstruct images of a higher quality according to the Peak Signal to Noise Ratio (PSNR), see Fig.1.

Figure 1: SadScientist

指定图像文件搜索路径

1. LATEX 预设路径是当前目录。
2. \graphicspath{{路径一}{路径二}{路径三}...}
3. \graphicspath{{images/}} % 不可省略大括号。
4. \includegraphics{} 直接将路径写进去，不建议，可读性差，移植性不好。

例：

\includegraphics[scale=0.5]{C:/Users/xuening/Desktop/paper1/paper/figures/problem.eps} // 移植性不好

\includegraphics[scale=0.5]{figures/problem.eps} // LATEX 预设路径是当前目录, 移植性好)

LaTeX使用(数学的排版)

数学公式排版

- LATEX 本身就有排版数学式子的能力
- 专业场合，需要更强功能。AMS-LATEX 是美国数学协会（American Mathematical Society, AMS）所发展的一个增强LATEX数学式子编辑的宏命令集，分成两个部分：amscls 及amsmath，前者提供符合AMS的文件规格的文稿类别，后者可加强原来 LATEX 的数学模式。

Math mode

- math inline mode
- math display mode

Inline mode

The final representation of IMFs is the weighted sum of $c_T^{imf_k}$. It can be obtained as follows:

$$c_T^{IMFs} = \sum_{k=1}^{n} \beta_T^k c_T^{imf_k}. \tag{17}$$

Display mode

Math mode

- 数学式需进入数学模式处理。
- 数学模式下，大部分文字、符号采用斜体字，且空间会另作安排，额外的空白会被忽略；
- 在数学模式中要输入一般的正常文字，要退出数学模式，或者由\mbox{} 或\textmr{} 包围起来。

Math inline mode

1. $ 数学式子$
2. \begin{math}数学式子\end{math}
3. \ (数学式子\ )

数学模式

```
\documentclass[10pt]{article}
\begin{document}
$f(x,y)=3x+4y$
$f(x, y) = 3x+ 4y$ % 空白不作用
\( \sin (2x) = -\sin x \cos x \)
\begin{math} f(x,y) = 3(x+y)y / (2xy-7) \end{math}
\end{document}
```

$$f(x,y)=3x+4y$$
$$f(x,y)=3x+4y$$
$$\sin(2x)=-\sin x\cos x$$
$$f(x,y)=3(x+y)y/(2xy-7)$$

非数学模式

```
\documentclass[10pt]{article}
\begin{document}
f(x,y)=3x+4y %
f(x, y) = 3x + 4y % 空白起用
sin(2x)=-sin x cos x
f(x,y) = 3(x+y)y / (2xy-7)
\end{document}
```

f(x,y)=3x+4y
f(x, y) = 3x + 4y
sin(2x)=-sin x cos x
f(x,y) = 3(x+y)y / (2xy-7)

Math display mode

1. \begin{displaymath} 数学式子\end{displaymath}
2. \[数学式子\]

   无编号

3. $$数学式子$$
4. \begin{equation}数学式子\end{equation}

   这种使用方式，亦会独立成一行，而且有编号。equation* 则无编号。

数学式后如果有标点符号，在inline mode中，标点不应纳入数学模式中；反之，在display mode中，标点符号则要纳入数学模式中。

数学公式

上标(Superscripts):

$$2x^3$$

$$2x^{34}$$

$$2x^{3x+4}$$

$$2x^{3x^4+5}$$

$2x^3$

$2x^{34}$

$2x^{3x+4}$

$2x^{3x^4+5}$

下标(Suberscripts):

$$2x_3$$

$$2x_{34}$$

$$2x_{34}$$

$2x_3$

$2x_{34}$

$2x_{34}$

数学公式

Greek letters
$$\pi$$
$$\alpha$$
$$A=\pi r^2$$

→ π

α

$A = \pi r^2$

Trig functions:
$$y=\sin{x}$$

→ $y = \sin x$

Log function:
$$ \log_5{x}$$
$$ \ln{x}$$

→ $\log_5 x$

$\ln x$

数学公式

Square roots:

$$\sqrt{2}$$

$$\sqrt[3]{2}$$

$$\sqrt{x^2+y^2}$$

$$\sqrt{1+\sqrt{x}}$$

$$\sqrt{2}$$

$$\sqrt[3]{2}$$

$$\sqrt{x^2+y^2}$$

$$\sqrt{1+\sqrt{x}}$$

Fractions:

$$ \frac{x}{x^2+x+1}$$

$$\frac{\sqrt{x+1}}{\sqrt{x-1}}$$

$$\frac{1}{1+\frac{1}{x}}$$

$$\sqrt{\frac{x}{x^2+x+1}}$$

$$\frac{x}{x^2+x+1}$$

$$\frac{\sqrt{x+1}}{\sqrt{x-1}}$$

$$\frac{1}{1+\frac{1}{x}}$$

$$\sqrt{\frac{x}{x^2+x+1}}$$

希腊字母

Symbol	LaTeX	Symbol	LaTeX
A and α	\Alpha and \alpha	N and ν	\Nu and \nu
B and β	\Beta and \beta	Ξ and ξ	\Xi and \xi
Γ and γ	\Gamma and \gamma	O and o	\Omicron and \omicron
Δ and δ	\Delta and \delta	Π, π and ϖ	\Pi, \pi and \varpi
E, ϵ and ε	\Epsilon, \epsilon and \varepsilon	P, ρ and ϱ	\Rho, \rho and \varrho
Z and ζ	\Zeta and \zeta	Σ, σ and ς	\Sigma, \sigma and \varsigma
H and η	\Eta and \eta	T and τ	\Tau and \tau
Θ, θ and ϑ	\Theta, \theta and \vartheta	Υ and υ	\Upsilon and \upsilon
I and ι	\Iota and \iota	Φ, ϕ, and φ	\Phi, \phi and \varphi
K, κ and $\varkappa$	\Kappa, \kappa and \varkappa	X and χ	\Chi and \chi
Λ and λ	\Lambda and \lambda	Ψ and ψ	\Psi and \psi
M and μ	\Mu and \mu	Ω and ω	\Omega and \omega

https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols

Trigonometric functions

Symbol	LaTeX	Symbol	LaTeX	Symbol	LaTeX	Symbol	LaTeX
sin	\sin	arcsin	\arcsin	csc	\csc	arccsc	\arccsc
cos	\cos	arccos	\arccos	sec	\sec	arcsec	\arcsec
tan	\tan	arctan	\arctan	cot	\cot	arccot	\arccot

Hyperbolic functions

Symbol	LaTeX	Symbol	LaTeX	Symbol	LaTeX	Symbol	LaTeX
sinh	\sinh	arsinh	\operatorname{arsinh}	csch	\operatorname{csch}	arcsch	\operatorname{arcsch}
cosh	\cosh	arcosh	\operatorname{arcosh}	sech	\operatorname{sech}	arsech	\operatorname{arsech}
tanh	\tanh	artanh	\operatorname{artanh}	coth	\coth	arcoth	\operatorname{arcoth}

https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols

Relation operators

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
$<$	<	is less than	$>$	>	is greater than
$\nless$	\nless	is not less than	$\ngtr$	\ngtr	is not greater than
$\leq$	\leq	is less than or equal to	$\geq$	\geq	is greater than or equal to
$\leqslant$	\leqslant	is less than or equal to	$\geqslant$	\geqslant	is greater than or equal to
$\nleq$	\nleq	is neither less than nor equal to	$\ngeq$	\ngeq	is neither greater than nor equal to
$\nleqslant$	\nleqslant	is neither less than nor equal to	$\ngeqslant$	\ngeqslant	is neither greater than nor equal to
$\prec$	\prec	precedes	$\succ$	\succ	succeeds
$\nprec$	\nprec	doesn't precede	$\nsucc$	\nsucc	doesn't succeed
$\preceq$	\preceq	precedes or equals	$\succeq$	\succeq	succeeds or equals
$\npreceq$	\npreceq	neither precedes nor equals	$\nsucceq$	\nsucceq	neither succeeds nor equals
$\ll$	\ll		$\gg$	\gg	
$\lll$	\lll		$\ggg$	\ggg	
$\subset$	\subset	is a proper subset of	$\supset$	\supset	is a proper superset of
$\not\subset$	\not\subset	is not a proper subset of	$\not\supset$	\not\supset	is not a proper superset of
$\subseteq$	\subseteq	is a subset of	$\supseteq$	\supseteq	is a superset of
$\nsubseteq$	\nsubseteq	is not a subset of	$\nsupseteq$	\nsupseteq	is not a superset of
$\sqsubset$	\sqsubset		$\sqsupset$	\sqsupset	
$\sqsubseteq$	\sqsubseteq		$\sqsupseteq$	\sqsupseteq	

Relation operators

Symbol	LaTeX	Comment
$=$	`=`	is equal to
$\doteq$	`\doteq`	
$\equiv$	`\equiv`	is equivalent to
$\approx$	`\approx`	is approximately
$\cong$	`\cong`	is congruent to
$\simeq$	`\simeq`	is similar or equal to
$\sim$	`\sim`	is similar to
$\propto$	`\propto`	is proportional to
$\neq$ or $\neq$	`\neq` or `\ne`	is not equal to

https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols

Binary operators

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
±	\pm	plus or minus	∩	\cap	set intersection	◇	\diamond		⊕	\oplus	
∓	\mp	minus or plus	∪	\cup	set union	△	\bigtriangleup		⊖	\ominus	
×	\times	multiplied by	⊎	\uplus	multiset addition	▽	\bigtriangledown		⊗	\otimes	
÷	\div	divided by	⊓	\sqcap		◁	\triangleleft		⊘	\oslash	
*	\ast	asterisk	⊔	\sqcup		▷	\triangleright		⊙	\odot	
⋆	\star		∨	\vee		◯	\bigcirc		∘	\circ	
†	\dagger		∧	\wedge		•	\bullet		\	\setminus	set difference
‡	\ddagger		·	\cdot		≀	\wr		∐	\amalg	

Negated binary relations

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
$\neq$ or $\neq$	\neq or \ne	is not equal to	$\notin$	\notin	is not member of
$\not<$	\nless	is not less than	$\not>$	\ngtr	is not greater than
$\not\leq$	\nleq	is not less than or equal to	$\not\geq$	\ngeq	is not greater than or equal to
$\not\leqslant$	\nleqslant		$\not\geqslant$	\ngeqslant	
$\not\leqq$	\nleqq		$\not\geqq$	\ngeqq	
$\lneq$	\lneq		$\gneq$	\gneq	
$\lneqq$	\lneqq		$\gneqq$	\gneqq	
$\lvertneqq$	\lvertneqq		$\gvertneqq$	\gvertneqq	
$\lnsim$	\lnsim		$\gnsim$	\gnsim	
$\lnapprox$	\lnapprox		$\gnapprox$	\gnapprox	
$\not\prec$	\nprec	does not precede	$\not\succ$	\nsucc	does not succeed
$\not\preceq$	\npreceq	neither precedes nor equals	$\not\succeq$	\nsucceq	neither succedes nor equals
$\precneqq$	\precneqq		$\succneqq$	\succneqq	
$\precnsim$	\precnsim		$\succnsim$	\succnsim	
$\precnapprox$	\precnapprox		$\succnapprox$	\succnapprox	
$\not\sim$	\nsim	is not similar to	$\not\cong$	\ncong	is not congruent to
$\nshortmid$	\nshortmid		$\nshortparallel$	\nshortparallel	
$\nmid$	\nmid		$\nparallel$	\nparallel	is not parallel with
$\nvdash$	\nvdash		$\nvDash$	\nvDash	
$\nVdash$	\nVdash		$\nVDash$	\nVDash	
$\not\triangleleft$	\ntriangleleft		$\not\triangleright$	\ntriangleright	
$\not\trianglelefteq$	\ntrianglelefteq		$\not\trianglerighteq$	\ntrianglerighteq	
$\not\subseteq$	\nsubseteq		$\not\supseteq$	\nsupseteq	
$\not\subseteqq$	\nsubseteqq		$\not\supseteqq$	\nsupseteqq	
$\subsetneq$	\subsetneq		$\supsetneq$	\supsetneq	
$\varsubsetneq$	\varsubsetneq		$\varsupsetneq$	\varsupsetneq	
$\subsetneqq$	\subsetneqq		$\supsetneqq$	\supsetneqq	
$\varsubsetneqq$	\varsubsetneqq		$\varsupsetneqq$	\varsupsetneqq	

Set and/or logic notation

Symbol	LaTeX	Comment
$\emptyset$ or $\emptyset$, and $\varnothing$	\O or \emptyset, and \varnothing	the empty set
$\mathbb{N}$	\N	set of natural numbers
$\mathbb{Z}$	\Z	set of integers
$\mathbb{Q}$	\Q	set of rational numbers
$\mathbb{A}$	\mathbb{A}	set of algebraic numbers
$\mathbb{R}$	\R	set of real numbers
$\mathbb{C}$	\C	set of complex numbers
$\mathbb{H}$	\mathbb{H}	set of quaternions
$\mathbb{O}$	\mathbb{O}	set of octonions
$\mathbb{S}$	\mathbb{S}	set of sedenions
$\in$	\in	is member of
$\notin$	\notin	is not member of
$\ni$	\ni	owns (has member)
$\subset$	\subset	is proper subset of
$\subseteq$	\subseteq	is subset of
$\supset$	\supset	is proper superset of
$\supseteq$	\supseteq	is superset of
$\cup$	\cup	set union
$\cap$	\cap	set intersection
$\setminus$	\setminus	set difference

Arrows

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
→ or →	\rightarrow or \to		⇒	\Rightarrow		⟶	\longrightarrow		⟹	\Longrightarrow	
↦	\mapsto					⟼	\longmapsto				
← or ←	\leftarrow or \gets		⇐	\Leftarrow		⟵	\longleftarrow		⟸	\Longleftarrow	

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
↑	\uparrow	Knuth's up-arrow notation	⇑	\Uparrow	
↓	\downarrow		⇓	\Downarrow	
↕	\updownarrow		⇕	\Updownarrow	

Other symbols

Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment	Symbol	LaTeX	Comment
∂	\partial	partial derivative	$\imath$	\imath		$\Re$	\Re	real part	∇	\nabla	del (vector calculus)
$\eth$	\eth		$\jmath$	\jmath		$\Im$	\Im	imaginary part	$\Box$	\Box	
$\hbar$	\hbar	reduced Planck's constant	ℓ	\ell		$\wp$	\wp	[Weierstrass] powerset	∞	\infty	infinity

AMS 数学环境:定理

- \usepackage{amsmath,amsthm,amssymb} % 引入AMS 数学环境
- amsthm 中\theoremstyle 定义了plain、definition 及remark 三种style。预设的是plain，即定理名称用粗体，内文是italic。\theoremstyle{remark} % 内文使用正常字体。
- 证明可以直接使用amsthm package 的proof 环境。

定理

\newtheorem 指令定义Theorem, Lemma, Definition等环境；

\newtheorem{环境名称}{定理名称}[章节层次]

The \newtheorem command has two mandatory arguments: the first one is the environment name that the author would like to use for this element; the second one is the heading text.

```
\documentclass{article}
\usepackage{amsthm}
\newtheorem{lem}{Lemma}
\begin{document}
\begin{lem} Text text ... \end{lem}
\end{document}
```

Lemma 1. *Text text . . .*

\newtheorem* 不产生序号

AMS定理

```
\documentclass{article}

\usepackage{amsthm}

\theoremstyle{remark} % 定理内文字用正体

\newtheorem{defi}{Definition} % 在preamble 取定义好环境名称

\begin{document}

\begin{defi}

Let $f$ be continuous on the half-open interval $[a, b)$ and suppose $\lim_{x\rightarrow b^-}|f(x)|=\infty$. Then, \[\int_a^bf(x)dx=\lim_{t\rightarrow b^-}\int_a^tf(x)dx\] provided this limit exists and is finite, in which case we say the    integral converges. Otherwise, we say it diverges.

\end{defi}

\end{document}
```

Definition 1. *Let f be continuous on the half-open interval $[a, b)$ and suppose $\lim_{x\to b^-} |f(x)| = \infty$. Then,*

$$\int_a^b f(x)dx = \lim_{t\to b^-} \int_a^t f(x)dx$$

provided this limit exists and is finite, in which case we say the integral converges. Otherwise, we say it diverges.

Proofs

```
\documentclass{article}
\usepackage{amsthm}
\theoremstyle{remark} % 文字用正体
\begin{document}
\begin{proof}
Let $f$ be continuous on the half-open interval $[a, b)$ and suppose $\lim_{x\rightarrow b^-}|f(x)|=\infty$. Then, \[\int_a^bf(x)dx=\lim_{t\rightarrow b^-}\int_a^tf(x)dx\] provided this limit exists and is finite, in which case we say the integral converges. Otherwise, we say it diverges.
\end{proof}
\end{document}
```

Proof. Let f be continuous on the half-open interval $[a, b)$ and suppose $\lim_{x\to b^-} |f(x)| = \infty$. Then,

$$\int_a^b f(x)dx = \lim_{t\to b^-}\int_a^t f(x)dx$$

provided this limit exists and is finite, in which case we say the integral converges. Otherwise, we say it diverges. □

行间方程与交叉引用

```
\documentclass{article}
\usepackage[colorlinks=true]{hyperref}
\begin{document}

\section{Method}
Here is the text of your introduction. We use some Latin nonsense text to fill the paragraphs. Here is an equation:

\begin{equation}
    \label{simple_equation}
    \alpha = \sqrt{ \beta }
\end{equation}

The proposed method is able to recover a better PSF, see Eq.\ref{simple_equation}

\end{document}
```

1 Method

Here is the text of your introduction. We use some Latin nonsense text to fill the paragraphs. Here is an equation:

$$\alpha = \sqrt{\beta} \tag{1}$$

The proposed method is able to recover a better PSF, see Eq.1

复杂公式输入

利用Mathtype软件的Cut and Copy preferences功能直接生成Latex命令。

LaTeX使用(参考文献)

参考文献(Bibliography,Reference)

thebibliography 环境

- [标记]：可选参数，如无，引用后用阿拉伯数字标记，外加方括号；如果有加入的话，引用后使用所加入的标记。
- {键值} ：引用时的关键字，
- 引用：\cite{键值}

```
\begin{thebibliography}
\bibitem[标记一]{键值一} 参考文献一
\bibitem[标记二]{键值二}参考文献二
...
\end{thebibliography}
```

文献引用：thebibliography 环境

```
\documentclass{article}
\begin{document}
This is my first paper\cite{KDEt}.

\begin{thebibliography}{}
\bibitem{KDEt} Knuth, D.E., \textit{The \TeX{}~book}, Reading, Massachusetts: Addison-Wesley, 1989.
\end{thebibliography}

\end{document}
```

This is my first paper[1].

References

[1] Knuth, D.E., *The TEX book*, Reading, Massachusetts: Addison-Wesley, 1989.

BibTEX 简介

参考文献按一定格式写于*.bib 文件，在文稿中以\bibliogrphy 指令来引入;

在latex 编译文稿后，再利用bibtex编译一次文稿，最后再使用latex重新编译。

例：

```
\begin{document}
\bibliogrphiystyle{plain} % 指定style
...
\bibliography{your.bib} % *.bib 可以省略
...
\end{document}
```

*.bib 文件格式

```
@book{ KDEt,
author = "Knuth, Donald E.",
year = "1989",
title = "The {\TeX}book",
publisher = "Addison-Wesley",
address = "Reading, Massachusetts",
volumn = " ",
edition = " ",
month = " ",
series = " ",
note = " ",
}
```

注：1）每行后的逗号不能省，名字可用Knuth, Donald E. 或Donald E. Knuth 两种格式；2) 两位以上的作者时要以and 来连接。3) 可使用LATEX的语法，但是需要大括号起来 4) % 不被接受。

*.bib 文件格式

- 参考文献格式由*.bst控制；
- 引用使用\cite 指令
- 要全部*.bib 里面的资料都印出来，可以用\nocite{*} 指令。

注：获得Bibtex的途径：

1) 从Google Scholer获得;
2) 从各种数据库获得；
3) 从各种文献管理软件中获得

*.bib 文件格式

- BibTEX 的参考文献格式由*.bst（bibliography style）控制，上面所引用的是plain 是引用plain.bst这种格式，这是最基本的格式。

其它格式：

- plain 依字母的顺序印出，比较顺序为author, year, title
- unsrt 依引用的先后次序印出
- abbrv 与plain 相同，但first name, month, title, journal 以缩写印出
- alpha 引用处显示[作者年份] 来取代数目。

参考文献

Mytext.tex

```
\documentclass{article}
\begin{document}
And finally take a look a more ordinary looking scientific reference \cite{Homer_2007}.
\bibliographystyle{plain}
\bibliography{Mybib}
\end{document}
```

Mybib.bib

```
@ARTICLE{Homer_2007,
  AUTHOR = "Homer Simpson and Mickey Mouse",
  TITLE = "On the theory of everything",
  JOURNAL = "Journal of the most useful theories",
  YEAR =  "2007",
  volume = "5",
  number =  "2",
  pages =  "123-456"
}

@MISC{Bibliography_howto,
  author =  {Tutorial team for the Indian TEX Users Group},
  title =  {Online tutorials on LaTeX},
  howpublished = "\url{http://www.tug.org.in/tutorials.html}"
}
```

And finally take a look a more ordinary looking scientific reference [1].

References

[1] Homer Simpson and Mickey Mouse. On the theory of everything. *Journal of the most useful theories*, 5(2):123–456, 2007.

LaTeX使用(交叉引用)

Cross References

LATEX 提供了三组交叉引用指令：

- \label{名称} % 置于被引用处，以一个名称标记；
- \ref{名称} % 引用\label 所标记处的章节
- \pageref{名称} % 引用\label 所标记处的页码

```
\section{文稿结构}\label{sec:struct}
...
\begin{figure}
\includesgrapics{1.jpg}
\caption{字型结构}
\label{fig:struct}
\end{figure}
```

```
...
预测结果见\ref{sec:struct}
节，第\pageref{sec:struct}
页，
请参考图\ref{fig:struct}，
第\pageref{fig:struct}页。
```

Cross References

1. 有些编辑器有交叉引用时，要编译两次才能正常显示。

2. 能编号的章节、图表、列举项目、公式、定理才能交叉引用。

3. 图表的参照\label 要在\caption 后，不能在前。

问题？

Email：shantan@hust.edu.cn