

Accept God & Endless Wins

# A Forgotten Guide to Spells of L<sup>A</sup>T<sub>E</sub>X

# Contents

<b>1</b>	<b>General Memo</b>	<b>1</b>
1.1	The size of font . . . . .	1
1.2	Common Macros . . . . .	2
1.3	icon or logo . . . . .	2
1.4	First Line Indentation . . . . .	2
1.5	Command Abbreviations . . . . .	2
<b>2</b>	<b>Mathematical typesetting</b>	<b>2</b>
2.1	Spaces and Whitespace . . . . .	2
2.2	Equation and text . . . . .	2
2.3	Math Font . . . . .	2
2.4	Brackets . . . . .	2
2.5	Virtual Binomial Coefficients . . . . .	3
2.6	Limit, Summation, Product, Integral . . . . .	3
2.7	Stacking and Overlays . . . . .	3
2.8	Equation Alignment . . . . .	4
2.9	Theorem . . . . .	4
2.10	Greek Alphabet (with var) . . . . .	4
2.11	Symbol . . . . .	4
2.12	Matrix . . . . .	5
2.13	Underlines . . . . .	5
<b>3</b>	<b>TikZ</b>	<b>5</b>
<b>4</b>	<b>Beamer</b>	<b>5</b>
4.1	Basic . . . . .	5
4.2	Github . . . . .	5
4.3	Font Color . . . . .	5
4.4	the height of headline . . . . .	5
<b>5</b>	<b>Template</b>	<b>6</b>
5.1	Template Collection . . . . .	6
<b>A</b>	<b>Remark</b>	<b>6</b>

## 1 General Memo

### 1.1 The size of font

- Common units: pt, 1pc = 12pt (Chinese size 4), 1in = 72.27pt, 1cm = 2.45pt, mm, em (width of the capital M in the current font size), ex (height of the lowercase x in the current font size)
- `\textwidth`: The total width for text on the page, which is the page width minus the left and right margins.
- `\linewidth`: The allowable line width for the current line of text.
- Variable length: 3pt to 8pt, written as 5pt plus 3pt minus 2pt
- Multiples: 1.5 `\parindent`

	tiny	scriptsize	footnotesize	small	normalsize	large	Large	LARGE	huge	Huge
10pt	5pt	7pt	8pt	9pt	10pt	12pt	14pt	17pt	20pt	25pt
11pt	6pt	8pt	9pt	10pt	11pt	12pt	14pt	17pt	20pt	25pt
12pt	6pt	8pt	10pt	11pt	12pt	14pt	17pt	20pt	25pt	25pt

## 1.2 Common Macros

- The non-roman letters `\usepackage{tipa}`: [tipa manural](#)
- orphan heading `\usepackage{needspace}`: `\needspace{5\baselineskip} \section{Title}` — starts a new page if there is less than 5 lines of space left.
- custom header style `\usepackage{fancyhdr}`: [fancyhdr manural](#)
- `\usepackage{ifthen}`: [ifthen manural](#)

## 1.3 icon or logo

- `\usepackage{fontawesome}`: [fontawesome manural](#)
- `\usepackage{fontawesome5}`: [fontawesome5 manural](#)
- `\usepackage{academicons}` [academicons manural](#)

## 1.4 First Line Indentation

Globally: `\setlength{\parindent}{0pt}`

Single paragraph: `\noindent`

## 1.5 Command Abbreviations

`\newcommand{\ab}{\abcdef}`

# 2 Mathematical typesetting

## 2.1 Spaces and Whitespace

Negative: `\!`

Thin: `\,`

Medium: `\:`

Thick: `\;`

Inter-word: `\`

Quad: `\quad`

Double-quad: `\qquad`

Horizontal: `\hspace{2cm}`

Vertical: `\vspace{-2cm}`

Reduce the space between formulas and text

```
\AtBeginDocument{
\addtolength{\abovedisplayskip}{-2ex}
\addtolength{\abovedisplaysshortskip}{-2ex}
\addtolength{\belowdisplayskip}{-2ex}
\addtolength{\belowdisplaysshortskip}{-2ex}}
```

## 2.2 Equation and text

`f_{[x_{i-1},x_i]}` `\text{ is monotonic,}` `\quad i = 1,\dots,c+1`

$f_{[x_{i-1},x_i]}$  is monotonic,  $i = 1, \dots, c + 1$

`\gcd(n,m\bmod n)` `;\quad x\equiv y\pmod b` `;\quad x\equiv y\pmod c` `;\quad x\equiv y\pmod d`

$\gcd(n, m \bmod n)$ ;  $x \equiv y \pmod{b}$ ;  $x \equiv y \pmod{c}$ ;  $x \equiv y \pmod{d}$

## 2.3 Math Font

`\mathcal{}`(no lowercase) *ABCDEFGHIJKLMNOPQRSTUVWXYZ*

`\mathscr{}`(no lowercase, need `mathrsfs`)

*A B C D E F G H I J K L M N O P Q R S T U V W X Y Z*

`\mathbb{}`(no lowercase, need `amssymb`) *ABCDEFGHIJKLMNOPQRSTUVWXYZ*

`\mathfrak{}` (uppercase and lowercase, need `amssymb`)

*A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z*

Upright letters: e (log base), `\mathrm{e}`; i (imaginary), `\mathrm{i}`; d (differential), `\mathrm{d}`;

custom: `\newcommand{\ue}{\mathrm{e}}`.

## 2.4 Brackets

## Preferred order:

`\bigl`, `\bigr` etc. from `amsmath`  
`\big`, `\Big`, `\bigg` required by some journals  
`\left(`, `\right)` minimum standard

For double brackets  $\llbracket 1;n \rrbracket$ : `\![1;n]\!`

## 2.5 Virtual Binomial Coefficients

${}^{12}_6C$ : `\mathrm{C}`  
 ${}^{12}_6\phantom{C}$ : `\phantom{1}6\mathrm{C}`  
 ${}^{12}_6C$ : `\prescript{12}{6}{\mathrm{C}}`  
 $\binom{n}{2}$ : `\binom{n}{2}` or `\{n\choose 2}`  
Taller  $\frac{\pi^2}{6}$ : `\dfrac{\pi^2}{6}` Shorter  $\frac{\pi^2}{6}$ : `\tfrac{\pi^2}{6}`  
 $\sqrt[3]{5}$ : `\sqrt[3]{5}`

## 2.6 Limit, Summation, Product, Integral

<code>\lim_{n\to\infty}</code>	$\lim_{n\rightarrow\infty}$
<code>\varlimsup_{n\to\infty}</code>	$\overline{\lim}_{n\rightarrow\infty}$
<code>\varliminf_{n\to\infty}</code>	$\underline{\lim}_{n\rightarrow\infty}$
<code>\sum_{n=1}^{\infty}</code>	$\sum_{n=1}^{\infty}$
<code>\prod_{n=1}^{\infty}</code>	$\prod_{n=1}^{\infty}$
<code>\int_0^{+\infty}</code>	$\int_0^{+\infty}$

## Multiple

`\lim\limits_{n\to\infty}`  
`\lim\limits_{x\to x_0 \atop y\to y_0}`  
`\lim\limits_{\substack{w\to w_0\\ x\to x_0\\ y\to y_0\\ z\to z_0}}`

$$\lim_{n\rightarrow\infty} \quad \lim_{\substack{x\rightarrow x_0\\ y\rightarrow y_0}} \quad \lim_{\substack{w\rightarrow w_0\\ x\rightarrow x_0\\ y\rightarrow y_0\\ z\rightarrow z_0}}$$

## 2.7 Stacking and Overlays

`\overline{m+n}`  
`\underbrace{a_1+\ldots+a_n}_n`  
`\overbrace{a_1+\ldots+a_n}^n`  
`\underbracket[0.4pt][1ex]{a_1+\cdots+a_n}_n`  
`b+\rlap{$\overbrace{\phantom{c+d+e+f}}^x$}c+d+\underbrace{e+f+g}_y+\,,h`

$$\overline{m+n} \quad \underbrace{a_1+\dots+a_n}_n \quad \overbrace{a_1+\dots+a_n}^n \quad \underbrace{a_1+\dots+a_n}_n \quad b+\overbrace{c+d+e+f}^x+\underbrace{g+h}_y$$

$\vec{a}$  `\vec{a}`  $\overrightarrow{PQ}$  `\overrightarrow{PQ}`  $\hat{A}$  `\hat{A}`  $\widehat{AB}$  `\widehat{AB}`  
 $\tilde{C}$  `\tilde{C}`  $\widetilde{CD}$  `\widetilde{CD}`  $\tilde{C}$  `\tilde{C}`

## 2.8 Equation Alignment

Use \* to suppress numbering

```


$$\begin{split} a &= b + c - d \\ &+ e - f \\ &= g + h \\ &= i \end{split}$$


```

$$\begin{aligned} a &= b + c - d \\ &+ e - f \\ &= g + h \\ &= i \end{aligned} \tag{1}$$

```


$$\begin{multline} a + b + c + d + e + f \\ + i + j + k + l + m + n \\ + o + p + q + r + s \end{multline}$$


```

$$\begin{aligned} a_1 &= b_1 + c_1 \\ a_2 &= b_2 + c_2 - d_2 + e_2 \end{aligned} \tag{2}$$

```


$$\begin{align} a_1 &= b_1 + c_1 \\ a_2 &= b_2 + c_2 - d_2 + e_2 \end{align}$$


```

$$\begin{aligned} a_1 &= b_1 + c_1 \\ a_2 &= b_2 + c_2 - d_2 + e_2 \end{aligned} \tag{4}$$

```


$$\begin{align} a_{11} &= b_{11} & a_{12} &= b_{12} \\ a_{21} &= b_{21} & a_{22} &= b_{22} + c_{22} \end{align}$$


```

$$\begin{aligned} a_{11} &= b_{11} & a_{12} &= b_{12} \\ a_{21} &= b_{21} & a_{22} &= b_{22} \end{aligned} \tag{6}$$

```


$$\begin{alignat}{2} a_1 &= b_1 + c_1 & & + e_1 - f_1 \\ a_2 &= b_2 + c_2 & - d_2 & + e_2 \end{alignat}$$


```

$$\begin{aligned} a_1 &= b_1 + c_1 & + e_1 - f_1 \\ a_2 &= b_2 + c_2 - d_2 + e_2 \end{aligned} \tag{8}$$

```


$$\begin{flalign} a_{11} &= b_{11} & a_{12} &= b_{12} \\ a_{21} &= b_{21} & a_{22} &= b_{22} \end{flalign}$$


```

$$\begin{aligned} a_{11} &= b_{11} & a_{12} &= b_{12} \\ a_{21} &= b_{21} & a_{22} &= b_{22} + c_{22} \end{aligned} \tag{10}$$

## 2.9 Theorem

`\newtheorem{envname}[counter]{text}[section]`

## 2.10 Greek Alphabet (with var)

$\vartheta$	<code>\vartheta</code>	$\varsigma$	<code>\varsigma</code>	$\Xi$	<code>\varXi</code>	$\Omega$	<code>\varOmega</code>
$\varpi$	<code>\varpi</code>	$\Gamma$	<code>\varGamma</code>	$\Pi$	<code>\varPi</code>	$F$	<code>\digamma</code>
$\varphi$	<code>\varphi</code>	$\Delta$	<code>\varDelta</code>	$\Upsilon$	<code>\varUpsilon</code>		
$\varrho$	<code>\varrho</code>	$\Theta$	<code>\varTheta</code>	$\Phi$	<code>\varPhi</code>		
$\varepsilon$	<code>\varepsilon</code>	$\Lambda$	<code>\varLambda</code>	$\Psi$	<code>\varPsi</code>		

[search](#)  
[learn](#)

## 2.11 Symbol

$+$	<code>+</code>	$\times$	<code>\times</code>	$\neq$	<code>\neq</code>
$\odot$	<code>\odot, \bigodot</code>	$\otimes$	<code>\otimes, \bigotimes</code>	$\leq$	<code>\leq</code>
$\oplus$	<code>\oplus, \bigoplus</code>	$\div$	<code>\div</code>	$\leqslant$	<code>\leqslant</code>

[amssyb](#)  
[esint](#)

$\geq$	<code>\geq</code>	$\cap$	<code>\cap,\bigcap</code>	$\oint$	<code>\ointctrlockwise</code>
$\geqslant$	<code>\geqslant</code>	$\cup$	<code>\cup,\bigcup</code>	$\oint$	<code>\varointclockwise</code>
$\gg$	<code>\gg</code>	$\wedge$	<code>\wedge,\bigwedge</code>	$\exists$	<code>\exists</code>
$\ll$	<code>\ll</code>	$\vee$	<code>\vee,\bigvee</code>	$\forall$	<code>\forall</code>
$\equiv$	<code>\equiv</code>	$\subset$	<code>\subset</code>	$\bullet$	<code>\bullet</code>
$\sim$	<code>\sim</code>	$\supset$	<code>\supset</code>	$\infty$	<code>\infty</code>
$\backsimeq$	<code>\backsimeq</code>	$\subseteq$	<code>\subseteq</code>	$\emptyset$	<code>\varnothing</code>
$\approx$	<code>\approx</code>	$\supseteq$	<code>\supseteq</code>	$\nabla$	<code>\nabla</code>
$\cong$	<code>\cong</code>	$\int$	<code>\int</code>	$\circ$	<code>\circ</code>
$\pm$	<code>\pm</code>	$\iint$	<code>\iint</code>	$\angle$	<code>\angle</code>
$\mp$	<code>\mp</code>	$\oint$	<code>\oint,\bigoint</code>	$\perp$	<code>\perp</code>
$\in$	<code>\in</code>	$\oint$	<code>\varoint</code>		

#### Another

`\DeclareMathOperator{\Hom}{Hom}` define Hom, and use `\Hom(V, W)` `a_1,a_2,\dots,a_n` and `a_1+a_2+\cdots+a_n`

## 2.12 Matrix

`\bigl( \begin{smallmatrix} a&b \\ c&d \end{smallmatrix} \bigr)`

There is a `smallmatrix` environment  $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$

## 2.13 Underlines

<code>\uline{Underlined}</code>	<i>Underlined</i>
<code>\uuline{Double Underlined}</code>	<i>DoubleUnderlined</i>
<code>\dashuline{Dashed Underline}</code>	<i>DashedUnderline</i>
<code>\usepackage{ulem}</code>	

## 3 TikZ

## 4 Beamer

### 4.1 Basic

- Matrix: Choose a Theme
- For Beautiful Presentations (EN)

### 4.2 Github

- CN

### 4.3 Font Color

`\setbeamercolor{frametitle}{fg=green}` `\setbeamercolor{title}{fg=green}`,  
or `\setbeamercolor{palette primary}{fg=red, bg=black}`

### 4.4 the height of headline

EX: `\usetheme[height=3cm]{Rochester}`

## 5 Template

### 5.1 Template Collection

- [KeepResearch](#): CN, more simple and clearer than overleaf
- [Latextemplates](#): EN, more simple and clearer than overleaf

#### 5.1.1 Github

- [Elegant](#)
- [ElegantBook: Anime-themed](#)
- [ExBook: Problem Set](#)

## A Remark

- The cover is from [Wechat](#)
- This section [2](#) is based on references such as [[1](#), [2](#)].

## References

- [1] M. Downes. Short Math Guide for LATEX. [AMS](#), 2017.
- [2] K. Wu. [Simple and Efficient L<sup>A</sup>T<sub>E</sub>X](#). 2020. [Note-by-LaTeX](#).