LaTeX & TeX

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最近更新 June 26, 2017

重要的尺寸

- 1英寸＝72.27点（pt）＝72大点（bp）＝25.4毫米，“点”也叫“磅”
- A4纸＝595 x 842pt = 8.264 x 11.69in = 210 x 297 mm
- 四号字大小＝12pt＝1pc＝4.2175mm ● 身份证尺寸＝85.6 x 54mm
- DPI = Dot Per Inch

文档类，包

- \documentclass{*options*}{*style*}
  - *style*: article report book slides letter
  - *options*: 10pt 11pt 12pt twiside twocolumn titlepage
- \usepackage[*options*]{*pkg*}
- \pagestyle{*style*}
  - *style*: plain empty headings myheadings
- \pagenumbering{*style*}
  - *style*: arabic roman alph Roman Alph

使用中文

- \usepackage{xeCJK} 在西文模板中加入这句并设置字体一般即可使用中文
  - \setCJKmainfont[BoldFont={SimHei},ItalicFont={KaiTi}]{FangSong}
  - \setCJKsansfont{SimHei}
  - \setCJKmonofont{KaiTi}
- 列出可用的中文字体 fc-list -f ``%{family}\n'' :lang=zh
- 安装新字体 首先拷贝SIMFANG.TTF等文件到/usr/share/fonts/myfonts/目录
  - 进入目录myfonts，执行sudo mkfontscale & mkfontdir & fc-cache -fv

获得帮助 texdoc

- texdoc的帮助 texdoc texdoc
- 某个包的帮助 texdoc xeCJK
- 所有的符号 texdoc symbols-a4
- 带窗口的文档浏览 texdoctk

绘图包“tikz”

- 获得文档 texdoc tikz
- 支持中文标注，只需要象前面那样引入xeCJK包即可
- \begin{tikzpicture}…

Front & Back (Title, Abstract, Contents)

- \maketitle Make title (\title, \author, \date)
- \begin{abstract} … Make abstract
- \tableofcontents Make table of contents

Displayed Paragraphs

- \begin{quote} … Short displayed quotation
- \begin{quotation} … Long displayed quotation
- \begin{verbatim} … Typewriter font exactly as formatted

Lists

- \begin{itemize} … Bulleted
- \begin{enumerate} … Numbered
- \begin{description} … Labeled (use \item[*lab*])
- \begin{list}{*label*}{*spacing*} … Lots of spaceing options
  - \topsep Extra vertical space at top of list
  - \partopsep Extra length at top if prececed by a blank line
  - \itemsep Extra vertical space between items
  - \parsep Vertical space between paragraphs within an item
  - \leftmargin Distance between environment left margin and the list
  - \rightmargin Distance between enviroment right margin and the list
  - \listparindent Extra space for paragraph indent after first in item
  - \itemindent Indentation of first line of an item
  - \labelsep Separation between label box and first line item text
  - \labelwidth Width of the box containing the label

Splitting the Input

- \input{*file*} Read in file
- \include{*file*} Read file unless \includeonly overrides
- \includeonly{*files*} Exclude any file in list

Line & Page Breaking

- \linebreak Force line break
- \\[*len*] Force line break and add vertical space
- \pagebreak Force page break (Also see: \newpage)
- \clearpage Dump all figures and start new page

Boxes

- \mbox{ … } Put a box around stuff
- \mfbox & \makefbox Like \mbox & \makebox with frame
- \makebox[*wd*][*pos*]{…} Box with width and position (l, r, c).
- \raisebox{*raise-ht*}[*ht*]{*text*} Raised typeset box

Paragraphs & Minipages

- \begin{minipage}[*pos*]{*wd*} …
- \parbox[*pos*]{*wd*}{…}

Space & Rules

- \hspace{*len*} Make a horz space. (Use * form to force)
- \hfill Infinitely stretchable space
- \vspace{*len*} Make a vert space. (Use * form to force)
- \hrulefill Draw horizontal line as long as possible
- \rule[*raise-ht*]{*wd*}{*ht*} Draw a blob of ink
- Horz space commands: \bigskip, \medskip, \smallskip
- Math horz space: \thinspace, \medspace, thickspace

Lengths

- \newlength{*cmd*} Make a new length command
- \setlength{*cmd*}{*len*} Set length *cmd* to *len*
- \addtolength{*cmd*}{*len*} Add given length to given command
- \settowidth{*cmd*}{*text*} Set length of *cmd* to the width *text*
- \settoheight{*cmd*}{*text*} Set length of *cmd* to the height *text*

NOTE: Units can be cm em ex in pc pt mm

Counters

\setcounter{*ctr*}{*n*} set counter to value
\addtocounter{*ctr*}{*n*} add value to counter

New Commands

\newcommand{*cmd*}[*n*]{*body*} command *cmd* with *n* args (arg vals: #n)

Tabular Environment

- \begin{tabular}[*pos*]{*col-fmt*} …

  The *col-fmt* argument specifies lines and column justification:
  - l Left-justified column
  - r Right-justified column
  - c Centered column
  - | Vertical rule
  - @{…} Text or space between columns
- \multicolumn{*n*}{*col*}{…} Span *n* columns with format *col*
- \hline Draw horizontal line across the table
- \cline{*i-j*} Draw horizontal line from col *i* to *j*

Figures and Tables

- \begin{figure}[*loc*] … Make a floating figure
- \begin{table}[*loc*] … Make a floating table
  - *loc*: h (here), h! (HERE!!), t (top), b (botom), p (page for floats)
- \caption{…} Caption figure or table. \label after \caption

Package “alltt”

- \begin{alltt} … Typeset like a verbatim block, except that the special symbols \, {, and } have the normal meaning.

Type Size

- \tiny ● \scriptsize ● \Large ● \footnotesize ● \small
- \normalsize ● \large ● \LARGE ● \huge ● \Huge

Type Style

- Paragraph mode
  - \textrm{…} Roman ● \textit{…} Italics ● \textbf{…} Bold
  - \textsc{…} Caps ● \texttt{…} Type ● \textsf{…} SSrf
  - \textsl{…} Slant
- math mode
  - \mathrm{…} Roman ● \mathit{…} Italics ● \mathbf{…} Bold
  - \mathsc{…} Caps ● \mathtt{…} Type ● \mathsf{…} SSrf
  - \mathcal{…} Cal ● \Bbb{…} AMS Black Board Bold

Sectioning

- \part ● \chapter ● \section ● \subsection
- \paragraph ● \subparagraph ● \appendix ● \subsubsection

Package “graphicx”

- \scalebox{*h_scl*}[*v_scl*]{...} One arg may be !
- \resizebox{*h_len*}{*v_len*}{...} One arg may be !
- \reflectbox{...}
- \rotatebox{*angle*}{...} Counterclockwise in degrees
- \includegraphics[*opts*]{*file_name*} Include graphic into document.
  - *opts*: comma seporated list of options
    - scale=*float* Scale value of 1 is natural sized
    - width=*len*
    - height=*len*
    - angle=*float* Counterclockwise *float* degrees
    - origin=*x y* Rotation origin
    - totalheight=*len* Height after rotation
    - keepaspectratio=*bol* Value is ``true'' or ``false''
    - clip=*bol* Clip image outside of bounding box
    - bb=*llx lly urx ury* Bounding Box. Values in points.
    - trim=*llx lly urx ury* Shrink bounding box. Values in points.

Package “xcolor”

- \definecolor{*clr-name*}{gray}{*val*} Define a gray color
- \definecolor{*clr-name*}{rgb}{*r,g,b*} Define an RGB color. r,g,b∈[0,1]
- \textcolor[*mdl*]{*fg_clr*}{...} Set *text* color
- \colorbox[*mdl*]{*bg_clr*}{...} Set *text* background color
- \fcolorbox[*mdl*]{*box_clr*}{*bg_clr*}{...} fbox with frame and background color
  - no *mdl* → named color: red, green, blue, cyan, yellow, magenta, black, white, gray, lightgray, brown, darkgray, lime, olive, orange, pink, purple, teal, violet, or a color defined via \definecolor,
  - *mdl* == rgb → color is comma separated triple: r,g,b∈[0,1]
  - *mdl* == gray → color is single float
  - *mdl* == HTML → color is six hex digits: RRGGBB

Cross Reference

- \label{*key*} Assign current counter to *key*
- \ref{*key*} Print value assigned to key
- \pageref{*key*} Print page number assigned to key

Package “hyperref”

- \href{*url*}{*text*} Make link, print *text* in document
- \url{*url*} Make link, print *url* with \texttt
- \hypersetup{colorlinks=true} Color links, don't put them in boxes

Package “fancyhdr”

- \pagestyle{fancy} Enable mode in preamble with \pagestyle
- \thispagestyle{*style*} Style for this page: Suppress all with ``empty''
- \lhead{...} Top. Left. Document classification
- \chead{...} Top. Center.
- \rhead{...} Top. Right. Document title
- \lfoot{...} Botom. Left.
- \cfoot{...} Botom. Center. Page number: \thepage
- \rfoot{...} Botom. Right. Signature: \mjrMRstd

Bibliography

- \cite{*label*} Cyte the bib entry with the given label
- Example bibliography done by hand:

```
\begin{thebibliography}{MMMMMM}
 \pagebreak[0] \samepage{
  \bibitem[Weihrauch 00]{KW00}
        Klaus Weihrauch (2000)\\
        \emph{Computable Analysis: An Introduction}\\
        ISBN 3-540-66817-9\\
           This book is well written and a fun read\ldots.}
\end{thebibliography}
```

Special Symbols

¶ \P § \S † \dag ‡ \ddag £ \pounds © \copyright

Math Mode Symbols

- Various Symbols

α	alpha	Γ	Gamma	φ	varphi	$\diamond$	diamond	$\leftarrow$	leftarrow
β	beta	Δ	Delta	χ	chi	$\angle$	angle	$\Leftarrow$	Leftarrow
γ	gamma	Θ	Theta	ψ	psi	$\perp$	bot	$\rightarrow$	rightarrow
δ	delta	Λ	Lambda	ω	omega	$\oplus$	oplus	$\Rightarrow$	Rightarrow
ϵ	epsilon	Ξ	Xi	$\prec$	prec	$\ominus$	ominus	$\leftrightarrow$	leftrightarrow
ε	varepsilon	Π	Pi	$\succeq$	succeq	$\otimes$	otimes	$\Leftrightarrow$	Leftrightarrow
ζ	zeta	Σ	Sigma	$\ldots$	ldots	$\oslash$	oslash	$\mapsto$	mapsto
η	eta	Υ	Upsilon	$\cdots$	cdots	$\odot$	odot	$\hookleftarrow$	hookleftarrow
θ	theta	Φ	Phi	$\aleph$	aleph	$\bigcirc$	bigcirc	$\leftharpoonup$	leftharpoonup
ϑ	vartheta	Ψ	Psi	$\prime$	prime	$\dagger$	dagger	$\leftharpoondown$	leftharpoondown
ι	iota	Ω	Omega	$\forall$	forall	$\ddagger$	ddagger	$\longleftarrow$	longleftarrow
κ	kappa	$\doteq$	doteq	∞	infty	$\amalg$	amalg	$\Longleftarrow$	Longleftarrow
λ	lambda	$\pm$	pm	$\hbar$	hbar	$\succ$	succ	$\longrightarrow$	longrightarrow
μ	mu	$\mp$	mp	$\emptyset$	emptyset	$\parallel$	parallel	$\Longrightarrow$	Longrightarrow
ν	nu	$\times$	times	$\exists$	exists	$\subseteq$	subseteq	$\longleftrightarrow$	longleftrightarrow
ξ	xi	$\div$	div	∇	nabla	$\propto$	propto	$\Longleftrightarrow$	Longleftrightarrow
	o	$*$	ast	$\surd$	surd	$\geq$	geq	$\longmapsto$	longmapsto
π	pi	$\star$	star	$\leq$	leq	$\triangle$	triangle	$\hookrightarrow$	hookrightarrow
ϖ	varpi	$\circ$	circ	$\imath$	imath	$\sim$	sim	$\rightharpoonup$	rightharpoonup
ρ	rho	$\bullet$	bullet	$\jmath$	jmath	$\subset$	subset	$\rightharpoondown$	rightharpoondown
ϱ	varrho	$\cdot$	cdot	ℓ	ell	$\supseteq$	supseteq	$\uparrow$	uparrow
σ	sigma	$\cap$	cap	$\neg$	neg	$\neq$	neq	$\Uparrow$	Uparrow
ς	varsigma	$\cup$	cup	$\top$	top	$\equiv$	equiv	$\downarrow$	downarrow
τ	tau	$\vee$	vee	$\flat$	flat	$\perp$	perp	$\Downarrow$	Downarrow
υ	upsilon	$\wedge$	wedge	$\natural$	natural	$\ll$	ll	$\updownarrow$	updownarrow
ϕ	phi	$\wr$	wr	$\sharp$	sharp	$\supset$	supset	$\Updownarrow$	Updownarrow
∂	partial	$\wp$	wp	$\searrow$	searrow	$\in$	in	$\triangleright$	triangleright
$\nearrow$	nearrow	$\cong$	cong	$\swarrow$	swarrow	$\nwarrow$	nwarrow	$\triangleleft$	triangleleft

- Funny Shaped Dots

$\vdots$	vdots	$\ddots$	ddots

- Variable-sized symbols

$\sum$	sum	$\prod$	prod	$\coprod$	coprod	$\int$	int	$\bigoplus$	bigoplus
$\oint$	oint	$\bigcap$	bigcap	$\bigcup$	bigcup	$\bigsqcup$	bigsqcup	$\biguplus$	biguplus
$\bigvee$	bigvee	$\bigwedge$	bigwedge	$\bigodot$	bigodot	$\bigotimes$	bigotimes		

- Delimiters

$\uparrow$	uparrow	$\Uparrow$	Uparrow	$\downarrow$	downarrow	$\Downarrow$	Downarrow	$\{$	{
$\}$	}	$\updownarrow$	updownarrow	$\Updownarrow$	Updownarrow	$\lfloor$	lfloor	$\rfloor$	rfloor
$\lceil$	lceil	$\rceil$	rceil	$\langle$	langle	$\rangle$	rangle	$\backslash$	backslash

- Large Delimiters

	rmoustache		lmoustache		rgroup		lgroup
$\vert$	arrowvert	$\Vert$	Arrowvert		bracevert		

AMS Math Mode Symbols

$\ulcorner$	ulcorner	$\urcorner$	urcorner	$\llcorner$	llcorner	$\lrcorner$	lrcorner				
$\beth$	beth	$\daleth$	daleth	$\gimel$	gimel	$\digamma$	digamma	$\varkappa$	varkappa		
$\Lsh$	Lsh	$\looparrowleft$	looparrowleft	$\downdownarrows$	downdownarrows	$\curvearrowleft$	curvearrowleft	$\rightarrowtail$	rightarrowtail	$\leftleftarrows$	leftleftarrows	$\downharpoonright$	downharpoonright
$\Rsh$	Rsh	$\upharpoonleft$	upharpoonleft	$\rightleftarrows$	rightleftarrows	$\upharpoonright$	upharpoonright	$\dashrightarrow$	dashrightarrow	$\rightleftarrows$	rightleftarrows	$\twoheadleftarrow$	twoheadleftarrow
$\multimap$	multimap	$\leftarrowtail$	leftarrowtail	$\curvearrowright$	curvearrowright	$\circlearrowright$	circlearrowright	$\rightsquigarrow$	rightsquigarrow	$\leftrightharpoons$	leftrightharpoons		
$\Lleftarrow$	Lleftarrow	$\dashleftarrow$	dashleftarrow	$\circlearrowleft$	circlearrowleft	$\leftrightarrows$	leftrightarrows	$\rightrightarrows$	rightrightarrows	$\rightleftharpoons$	rightleftharpoons		
$\upuparrows$	upuparrows	$\looparrowright$	looparrowright	$\downharpoonleft$	downharpoonleft	$\rightleftarrows$	rightleftarrows	$\twoheadrightarrow$	twoheadrightarrow	$\leftrightsquigarrow$	leftrightsquigarrow		
$\nleftarrow$	nleftarrow	$\nrightarrow$	nrightarrow	$\nLeftarrow$	nLeftarrow	$\nRightarrow$	nRightarrow	$\nleftrightarrow$	nleftrightarrow	$\nLeftrightarrow$	nLeftrightarrow		
$\ggg$	ggg	$\lessdot$	lessdot	$\sqsupset$	sqsupset	$\backsimeq$	backsimeq	$\eqcirc$	eqcirc	$\backsim$	backsim	$\gtrsim$	gtrsim
$\lll$	lll	$\succcurlyeq$	succsim	$\thicksim$	thicksim	$\Vdash$	Vdash	$\Bumpeq$	Bumpeq	$\because$	because	$\sqsubset$	sqsubset
$\gtrdot$	gtrdot	$\precsim$	precsim	$\subseteqq$	subseteqq	$\backsim$	smallsmile	$\Subset$	Subset	$\between$	between	$\shortmid$	shortmid
$\nVDash$	nVDash	$\lesssgtr$	lessgtr	$\pitchfork$	pitchfork	$\smallfrown$	smallfrown	$\Supset$	Supset	$\geqslant$	geqslant	$\succcurlyeq$	succcurlyeq
$\leqslant$	leqslant	$\lesssim$	lesssim	$\supseteqq$	supseteqq	$\varpropto$	varpropto	$\Vvdash$	Vvdash	$\approxeq$	approxeq	$\risingdotseq$	risingdotseq
$\gtrless$	gtrless	$\lesseqgtr$	lesseqgtr	$\lessapprox$	lessapprox	$\precapprox$	precapprox	$\succapprox$	succapprox	$\eqslantgtr$	eqslantgtr	$\blacktriangleleft$	blacktriangleleft
$\curlyeqprec$	curlyeqprec	$\curlyeqsucc$	curlyeqsucc	$\shortparallel$	shortparallel	$\fallingdotseq$	fallingdotseq	$\therefore$	therefore	$\trianglelefteq$	triangleq	$\blacktriangleright$	blacktriangleright
$\eqslantless$	eqslantless	$\backepsilon$	backepsilon	$\trianglelefteq$	trianglelefteq	$\trianglerighteq$	trianglerighteq	$\doteqdot$	doteqdot	$\gtrdot$	gtrdot		
$\thickapprox$	thickapprox	$\preccurlyeq$	preccurlyeq	$\vartriangleleft$	vartriangleleft	$\vartriangleright$	vartriangleright	$\circeq$	circeq	$\leqslant$	leqslant		
$\gnapprox$	gnapprox	$\gneq$	gneq	$\gneqq$	gneqq	$\gnsim$	gnsim	$\gvertneqq$	gvertneqq	$\ntriangleleft$	ntriangleleft	$\ntrianglelefteq$	ntrianglelefteq
$\lnapprox$	lnapprox	$\lneq$	lneq	$\lneqq$	lneqq	$\lnsim$	lnsim	$\lvertneqq$	lvertneqq	$\nvDash$	nvDash	$\nvdash$	nvdash
$\nVDash$	nVDash	$\ncong$	ncong	$\ngeq$	ngeq	$\ngeqq$	ngeqq	$\ngeqslant$	ngeqslant	$\subsetneqq$	subsetneqq	$\succnapprox$	succnapprox
$\ngtr$	ngtr	$\nleq$	nleq	$\nleqq$	nleqq	$\nleqslant$	nleqslant	$\nless$	nless	$\varsubsetneq$	varsubsetneq	$\varsubsetneqq$	varsubsetneqq
$\nmid$	nmid	$\nparallel$	nparallel	$\nprec$	nprec	$\npreceq$	npreceq	$\nshortmid$	nshortmid	$\nsupseteq$	nsupseteq	$\nsupseteqq$	nsupseteqq
$\nshortparallel$	nshortparallel	$\nsim$	nsim	$\nsubseteq$	nsubseteq	$\nsucc$	nsucc	$\nsucceq$	nsucceq	$\ntrianglerighteq$	ntrianglerighteq	$\nvDash$	nvDash
$\nsucceq$	nsucceq	$\precnsim$	precnsim	$\subsetneq$	subsetneq	$\succnsim$	succnsim	$\precnapprox$	precnapprox				
$\ntriangleright$	ntriangleright	$\supsetneq$	supsetneq	$\supsetneqq$	supsetneqq	$\varsupsetneq$	varsupsetneq	$\varsupsetneqq$	varsupsetneqq	$\smallsetminus$	smallsetminus	$\veebar$	veebar
$\Cap$	Cap	$\Cup$	Cup	$\barwedge$	barwedge	$\boxdot$	boxdot	$\boxminus$	boxminus	$\boxplus$	boxplus	$\boxtimes$	boxtimes
$\centerdot$	centerdot	$\circledast$	circledast	$\circledcirc$	circledcirc	$\circleddash$	circleddash	$\curlyvee$	curlyvee	$\curlywedge$	curlywedge	$\divideontimes$	divideontimes
$\dotplus$	dotplus	$\doublebarwedge$	doublebarwedge	$\intercal$	intercal	$\leftthreetimes$	leftthreetimes	$\ltimes$	ltimes	$\rightthreetimes$	rightthreetimes	$\rtimes$	rtimes
$\Bbbk$	Bbbk	$\Finv$	Finv	$\Game$	Game	$\angle$	angle	$\backprime$	backprime	$\bigstar$	bigstar	$\blacklozenge$	blacklozenge
$\blacksquare$	blacksquare	$\blacktriangle$	blacktriangle	$\blacktriangledown$	blacktriangledown	$\circledS$	circledS	$\complement$	complement	$\diagdown$	diagdown	$\diagup$	diagup
$\eth$	eth	$\hbar$	hbar	$\hslash$	hslash	$\lozenge$	lozenge	$\measuredangle$	measuredangle	$\mho$	mho	$\nexists$	nexists
$\sphericalangle$	sphericalangle	$\square$	square	$\triangledown$	triangledown	$\varnothing$	varnothing	$\vartriangle$	vartriangle				

Mathematical Environments

- $ … $ OR \(… \) — Inline formula
- $$ … $$ OR \[… \] — Displayed formula
- \begin{equation} … \end{equation} — Numbered equation
- \begin{eqnarray} … \end{eqnarray} — Numbered array (rcl) of equations

Common Math Constructs

- $\sqrt{abc}$ — \sqrt{abc}
- $\sqrt[n]{abc}$ — \sqrt[n]{abc}
- $\frac{abc}{xyz}$ — \frac{abc}{xyz}
- $\stackrel{a}{b}$ — \stackrel{a}{b}
- $\int\limits_{x\in X} x\,dx$ — \int\limits_{x\in X}\!x\, dx
- $\int_0^1 x\,dx$ — \int_0^1 x\, dx
- $\begin{array}{cc} a & b \\ c & d \end{array}$ — \begin{array}{cc} a & b \\ c & d \end{array}
- f' — f'

Stretching Math Mode Delimiters

- $\left(\frac{abc}{xyz}\right)$ — \left(\frac{abc}{xyz}\right)
- $\int \frac{abc}{xyz}\Big|$ — \left.\int\frac{abc}{xyz}\right\vert

Over & Under Delimiters & Accents

- Over & Under

$\widetilde{abc}$	\widetilde{abc}	$\widehat{abc}$	\widehat{abc}	$\overbrace{abc}$	\overbrace{abc}
$\overleftarrow{abc}$	\overleftarrow{abc}	$\overrightarrow{abc}$	\overrightarrow{abc}		
$\overline{abc}$	\overline{abc}	$\underline{abc}$	\underline{abc}	$\underbrace{abc}$	\underbrace{abc}

- Accents

$\acute{x}$	\acute{x}	$\bar{x}$	\bar{x}	$\breve{x}$	\breve{x}	$\check{x}$	\check{x}	$\ddot{x}$	\ddot{x}
$\dot{x}$	\dot{x}	$\grave{x}$	\grave{x}	$\hat{x}$	\hat{x}	$\tilde{x}$	\tilde{x}	$\vec{x}$	\vec{x}