

L^AT_EX & T_EX

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Document Class, Packages, and Styles

- `\begin{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

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 spacing options
- `\topsep` Extra vertical space at top of list
- `\partopsep` Extra length at top if preceded 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 environment 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
- `\fbox & \makebox` 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: `\thisspace`, `\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
 - `\settoheight{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 (bottom), 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 separated 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: `\mjmrRstd`

Bibliography

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

```
\begin{thebibliography}{MMMMMM}
\pagebreak[0] \samespage{
\@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}
```

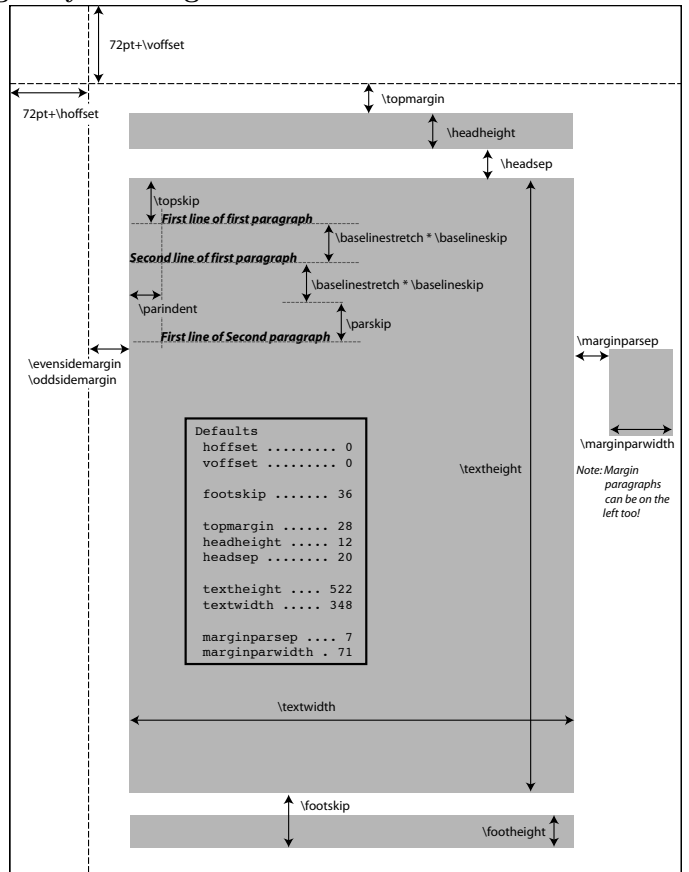
Special Symbols

\P \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 | \sphericalangle 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 | \rightarrowtail leftrightarrow |
| ε varepsilon | Π Pi | \succ succeq | \otimes otimes | \leftrightarrow Leftrightarrow |
| ζ zeta | Σ Sigma | \dots ldots | \oslash oslash | \mapsto mapsto |
| η eta | Υ Upsilon | \cdots cdots | \odot odot | \hookrightarrow hookrightarrow |
| θ theta | Φ Phi | \aleph aleph | \bigcirc bigcirc | \leftharpoonup leftharpoonup |
| ϑ vartheta | Ψ Psi | \prime prime | \dagger dagger | \leftharpoonup leftharpoonup |
| ι iota | Ω Omega | \forall forall | \ddagger ddagger | \leftarrowtail longleftarrow |
| κ kappa | \pm doteq | ∞ infy | \amalg amalg | \longleftarrow Longleftarrow |
| λ lambda | \mp pm | h hbar | \succ succ | \longrightarrow longrightarrow |
| μ mu | \mp mp | \emptyset emptyset | \parallel parallel | \Rightarrow Longrightarrow |
| ν nu | \times times | \exists exists | \subseteq subseteq | \longleftrightarrow longleftrightarrow |
| ξ xi | \div div | ∇ nabla | \supseteq supseteq | \longleftrightarrow Longleftrightarrow |
| \omicron o | $*$ ast | \surd surd | \geq geq | \mapsto longmapsto |
| π pi | $*$ 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 | \rightharpoonup rightharpoonup |
| e 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 | b 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 | \nrightarrow nrightarrow | \triangleleft triangleleft |
| • Funny Shaped Dots | | | | |
| \vdots vdots | \ddots ddots | | | |
| • Variable-sized symbols | | | | |
| \sum sum | \prod prod | \coprod coprod | \int int | \oplus 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 | | | | |
| \lrcorner lrcorner | \lgroup lgroup | \rgroup rgroup | \lgroup lgroup | |
| \arrowvert arrowvert | \Arrowvert Arrowvert | \bracevert bracevert | | |

Page Layout Lengths



AMS Math Mode Symbols

| | | | | | | |
|----------------------------------|----------------------------------|--------------------------------------|--------------------------------------|--|---------------------------------------|--|
| \llcorner llcorner | \urcorner urcorner | \llcorner llcorner | \lrcorner lrcorner | \times varkappa | \leftleftarrows leftleftarrows | \downdownarrows downdownarrows |
| \beth beth | \daleth daleth | \gimel gimel | \digamma digamma | \rightarrowtail rightarrowtail | \rightleftarrows rightleftarrows | \twoheadleftarrow twoheadleftarrow |
| \Lsh Lsh | \looparrowleft looparrowleft | \downdownarrows downdownarrows | \curvearrowleft curvearrowleft | \upharpoonright upharpoonright | \dashrightarrow dashrightarrow | \twoheadrightarrow twoheadrightarrow |
| \multimap multimap | \upharpoonleft upharpoonleft | \rightleftarrows rightleftarrows | \circlearrowright circlearrowright | \circlearrowright circlearrowright | \rightsquigarrow rightsquigarrow | \leftrightharpoons leftrightharpoons |
| \Lleftarrow Lleftarrow | \dashleftarrow dashleftarrow | \circlearrowleft circlearrowleft | \circlearrowleft circlearrowleft | \rightarrowtail rightrightarrowtail | \rightleftarrows rightleftarrows | \leftrightsquigarrow leftrightsquigarrow |
| \uparrows uparrows | \looparrowright looparrowright | \downharpoonleft downharpoonleft | \rightrightarrows rightrightarrows | \twoheadrightarrow twoheadrightarrow | \rightarrowtail rightrightarrowtail | \leftrightsquigarrow leftrightsquigarrow |
| \nleftarrow nleftarrow | \nrightarrow nrightarrow | \downharpoonright downharpoonright | \nrightarrow nrightarrow | \nleftarrow nleftarrow | \rightarrowtail rightrightarrowtail | \leftrightsquigarrow leftrightsquigarrow |
| \ggg ggg | \lessdot lessdot | \sqsupset sqsupset | \backsim backsim | \eqcirc eqcirc | \rightarrowtail rightrightarrowtail | \gtrsim gtrsim |
| \lll lll | \succsim succsim | \sqsubset sqsubset | \thicksim thicksim | \bumpeq bumpeq | \rightarrowtail rightrightarrowtail | \lesssim lesssim |
| \geqq geqq | \precsim precsim | \subseteq subseteq | \prec prec | \Subset Subset | \rightarrowtail rightrightarrowtail | \succsim succsim |
| \vDash vDash | \lessgtr lessgtr | \supseteq supseteq | \pitchfork pitchfork | \Supset Supset | \rightarrowtail rightrightarrowtail | \succcurlyeq succcurlyeq |
| \leqq leqq | \lesssim lesssim | \supseteq supseteq | \supseteq supseteq | \Vvdash Vvdash | \rightarrowtail rightrightarrowtail | \risingdotseq risingdotseq |
| \gtrless gtrless | \lesseqgtr lesseqgtr | \approx approx | \lesseqgtr lesseqgtr | \precapprox precapprox | \rightarrowtail rightrightarrowtail | \blacktriangleleft blacktriangleleft |
| \curlyeqprec curlyeqprec | \curlyeqsucc curlyeqsucc | \shortparallel shortparallel | \shortparallel shortparallel | \fallingdotseq fallingdotseq | \rightarrowtail rightrightarrowtail | \blacktriangleright blacktriangleright |
| \eqslantless eqslantless | \backepsilon backepsilon | \trianglelefteq trianglelefteq | \trianglelefteq trianglelefteq | \trianglerighteq trianglerighteq | \rightarrowtail rightrightarrowtail | \gtrdot gtrdot |
| \thickapprox thickapprox | \preccurlyeq preccurlyeq | \vartriangleleft vartriangleleft | \vartriangleleft vartriangleleft | \vartriangleright vartriangleright | \rightarrowtail rightrightarrowtail | |
| \gnapprox gnapprox | \gneq gneq | \vartriangleright vartriangleright | \vartriangleright vartriangleright | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \lnapprox lnapprox | \lneq lneq | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \nVDash nVDash | \lneqq lneqq | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \ngtr ngtr | \nleq nleq | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \nmid nmid | \nparallel nparallel | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \nshortparallel nshortparallel | \nsim nsim | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \nsucceq nsucceq | \precsim precsim | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \ntriangleright ntriangleright | \supseteq supseteq | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \Cap Cap | \supseteq supseteq | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \cdot centerdot | \circledast circledast | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \dagger dotplus | \doublebarwedge doublebarwedge | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \Bbbk Bbbk | \Finv Finv | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \blacksquare blacksquare | \blacktriangle blacktriangle | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \eth eth | \hbar hbar | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| \sphericalangle sphericalangle | \square square | \gtrsim gtrsim | \gtrsim gtrsim | \gtrsim gtrsim | \rightarrowtail rightrightarrowtail | |
| | | \triangledown triangledown | \varnothing varnothing | Δ vartriangle | | |

Mathematical Environments

- $\$ \dots \$$ OR $\{(\dots)\}$ Inline formula
- $\$\$ \dots \$\$$ OR $\left[\dots \right]$ Displayed formula
- $\backslash begin{equation} \dots \backslash end{equation}$ Numbered equation
- $\backslash begin{eqnarray} \dots \backslash end{eqnarray}$ Numbered array (rc1) of equations

Common Math Constructs

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

Stretching Math Mode Delimiters

- $\left(\frac{abc}{xyz} \right)$ \left(\frac{abc}{xyz} \right)
- $\int \frac{abc}{xyz}$ \left. \int \frac{abc}{xyz} \right\}

Over & Under Delimiters & Accents

- Over & Under
 - \widetilde{abc} \widetilde{abc}
 - \overleftarrow{abc} \overleftarrow{abc}
 - \overline{abc} \overline{abc}
 - \widehat{abc} \widehat{abc}
 - \overrightarrow{abc} \overrightarrow{abc}
 - \overbrace{abc} \overbrace{abc}
 - \underline{abc} \underline{abc}
 - \underbrace{abc} \underbrace{abc}
- Accents
 - \acute{x} \acute{x}
 - \grave{x} \grave{x}
 - \breve{x} \breve{x}
 - \check{x} \check{x}
 - \dot{x} \dot{x}
 - \grave{x} \grave{x}
 - \hat{x} \hat{x}
 - \tilde{x} \tilde{x}
 - \vec{x} \vec{x}