Latex Symbols Template

Short symbol commands for LaTeX

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Contents

1   Installation and usage:

1. Download the `symbols.tex` file and put is in the same folder as that of the main `.tex` file.

2. Add `\input{symbols.tex}` after all `\usepackage{}` headers in the main `.tex` file.

3. Refer to `test.tex` and `test.pdf` for further help.

2   Packages used:

Thanks to these packages. They are all included and no need to include them manually. Other packages might have issues with it.

1. `algorithm`

2. `amsmath`

3. `amsthm`

4. `amssymb`

5. `dsfont`

6. `algpseudocode`

7. `thmtools`

8. `xcolor`

3   Available environments:

1. `Theorem`

2. `Definition`

3. `Proposition`

4. `Lemma`

5. `Corollary`

6. `Example`

7. `Remark`

8. `subsec`

See Section 6 for usage information.

4   Extras in algorithms:

If you use `algorithmic` inside `algorithm` environment,

1. All the following introductory commands are valid

   - using `\Require` will result into `Require:`
   - using `\Ensure` will result into `Ensure:`
   - using `\Input` will result into `Input:`
   - using `\Init` will result into `Initialize:`
   - using `\Output` will result into `Output:`

2. `\Print` and `\To` commands are compatible with required packages

See Section 7 for usage information.

5 Tables of usage:

5.1 Lower case bold English alphabets

Syntax	Description	Syntax	Description	Syntax	Description	Syntax	Description
\ba	a	\bb	b	\bc	c	\bd	d
\be	e	\bdf	f	\bg	g	\bh	h
\bi	i	\bj	j	\bk	k	\bl	l
\bm	m	\bn	n	\bo	o	\bp	p
\bq	q	\br	r	\bs	s	\bt	t
\bu	u	\bv	v	\bw	w	\bx	x
\by	y	\bz	z				

5.2 Upper case bold English alphabets

Syntax	Description	Syntax	Description	Syntax	Description	Syntax	Description
\bA	A	\bB	B	\bC	C	\bD	D
\bE	E	\bF	F	\bG	G	\bH	H
\bI	I	\bJ	J	\bK	K	\bL	L
\bM	M	\bN	N	\bO	O	\bP	P
\bQ	Q	\bR	R	\bS	S	\bT	T
\bU	U	\bV	V	\bW	W	\bX	X
\bY	Y	\bZ	Z				

5.3 Bold Greek alphabets

Syntax	Description	Syntax	Description	Syntax	Description
\balpha	α	\bbeta	β	\bgamma	γ
\bGamma	Γ	\bdelta	δ	\bDelta	Δ
\bepsilon	ϵ	\bvarepsilon	ε	\bzeta	ζ
\bdeta	η	\btheta	θ	\bvartheta	ϑ
\bTheta	Θ	\biota	ι	\bkappa	κ
\blambda	λ	\bLambda	Λ	\bmu	μ
\bnu	ν	\bxi	ξ	\bXi	Ξ
\bpi	π	\bPi	Π	\brho	ρ
\bvarrho	ϱ	\bsigma	σ	\bSigma	Σ
\btau	τ	\bupsilon	υ	\bUpsilon	Υ
\bphi	ϕ	\bvarphi	φ	\bPhi	Φ
\bchi	χ	\bpsi	ψ	\bPsi	Ψ
\bomega	ω	\bOmega	Ω		

5.4 Mathbf lower case English alphabets

Syntax	Description	Syntax	Description	Syntax	Description	Syntax	Description
\mba	$\mathbf{a}$	\mbb	$\mathbf{b}$	\mbc	$\mathbf{c}$	\mbd	$\mathbf{d}$
\mbe	$\mathbf{e}$	\mbf	$\mathbf{f}$	\mbg	$\mathbf{g}$	\mbh	$\mathbf{h}$
\mbi	$\mathbf{i}$	\mbj	$\mathbf{j}$	\mbk	$\mathbf{k}$	\mbl	$\mathbf{l}$
\mbm	$\mathbf{m}$	\mbn	$\mathbf{n}$	\mbo	$\mathbf{o}$	\mbp	$\mathbf{p}$
\mbq	$\mathbf{q}$	\mbr	$\mathbf{r}$	\mbs	$\mathbf{s}$	\mbt	$\mathbf{t}$
\mbu	$\mathbf{u}$	\mbv	$\mathbf{v}$	\mbw	$\mathbf{w}$	\mbx	$\mathbf{x}$
\mby	$\mathbf{y}$	\mbz	$\mathbf{z}$				

5.5 Mathbf upper case English alphabets

Syntax	Description	Syntax	Description	Syntax	Description	Syntax	Description
\mbA	$\mathbf{A}$	\mbB	$\mathbf{B}$	\mbC	$\mathbf{C}$	\mbD	$\mathbf{D}$
\mbE	$\mathbf{E}$	\mbF	$\mathbf{F}$	\mbG	$\mathbf{G}$	\mbH	$\mathbf{H}$
\mbI	$\mathbf{I}$	\mbJ	$\mathbf{J}$	\mbK	$\mathbf{K}$	\mbL	$\mathbf{L}$
\mbM	$\mathbf{M}$	\mbN	$\mathbf{N}$	\mbO	$\mathbf{O}$	\mbP	$\mathbf{P}$
\mbQ	$\mathbf{Q}$	\mbR	$\mathbf{R}$	\mbS	$\mathbf{S}$	\mbT	$\mathbf{T}$
\mbU	$\mathbf{U}$	\mbV	$\mathbf{V}$	\mbW	$\mathbf{W}$	\mbX	$\mathbf{X}$
\mbY	$\mathbf{Y}$	\mbZ	$\mathbf{Z}$				

5.6 Caligraphy upper case English alphabets

Syntax	Description	Syntax	Description	Syntax	Description	Syntax	Description
\calA	$\mathcal{A}$	\calB	$\mathcal{B}$	\calC	$\mathcal{C}$	\calD	$\mathcal{D}$
\calE	$\mathcal{E}$	\calF	$\mathcal{F}$	\calG	$\mathcal{G}$	\calH	$\mathcal{H}$
\calI	$\mathcal{I}$	\calJ	$\mathcal{J}$	\calK	$\mathcal{K}$	\calL	$\mathcal{L}$
\calM	$\mathcal{M}$	\calN	$\mathcal{N}$	\calO	$\mathcal{O}$	\calP	$\mathcal{P}$
\calQ	$\mathcal{Q}$	\calR	$\mathcal{R}$	\calS	$\mathcal{S}$	\calT	$\mathcal{T}$
\calU	$\mathcal{U}$	\calV	$\mathcal{V}$	\calW	$\mathcal{W}$	\calX	$\mathcal{X}$
\calY	$\mathcal{Y}$	\calZ	$\mathcal{Z}$				

5.7 Numbers

Syntax	Description	Syntax	Description
\bzero	$\mathbf{0}$	\bone	$\mathbf{1}$

5.8 Sets and notations

Syntax	Description	Syntax	Description	Syntax	Description
\binaryB{N}	$\mathbb{B}^N$	\complexC{N}	$\mathbb{C}^N$	\expecE{\bx}	$\mathbb{E}\left\{\boldsymbol{x}\right\}$
\naturalN{N}	$\mathbb{N}^N$	\probP{\bx}	$\mathbb{P}\mathrm{r}\left\{\boldsymbol{x}\right\}$	\rationalQ{N}	$\mathbb{Q}^N$
\realR{N}	$\mathbb{R}^N$	\realRp{N}	$\mathbb{R}^N_+$	\realRn{N}	$\mathbb{R}^N_-$
\integerZ{N}	$\mathbb{Z}^N$				

5.9 Matrix terms

Syntax	Description	Syntax	Description	Syntax	Description
\tr{X}	$\mathrm{Tr}\,(X)$	\vec{X}	$\mathrm{vec}\,(X)$	\diag{X}	$\mathrm{diag}\,(X)$
\Diag{\bx}	$\mathrm{Diag}\,(\boldsymbol{x})$	\bdiag{X}	$\mathbf{diag}\,(X)$	\cov{\bx}	$\mathrm{cov}\,(\boldsymbol{x})$
\Cov{X}	$\mathrm{Cov}\,(X)$	\bcov{\bx}	$\mathbf{cov}\,(\boldsymbol{x})$		

5.10 Misc.

Syntax	Description	Syntax	Description	Syntax	Description
\asin{x}	$\sin^{-1}(x)$	\acos{x}	$\cos^{-1}(x)$	\atan{x}	$\tan^{-1}(x)$
\acsc{x}	$\csc^{-1}(x)$	\asec{x}	$\sec^{-1}(x)$	\acot{x}	$\cot^{-1}(x)$
\implies	$\Rightarrow$	\half	$\frac{1}{2}$	\roothalf	$\frac{1}{\sqrt{2}}$
\third	$\frac{1}{3}$	\quarter	$\frac{1}{4}$	\fourth	$\frac{1}{4}$
\fifth	$\frac{1}{5}$	\threequarter	$\frac{3}{4}$	\ejomg	$e^{j\omega}$
\ejnomg	$e^{-j\omega}$	\zinv	z^{-1}	\sgn{x}	$\text{sgn}(x)$
\sign{x}	$\text{sign}(x)$	\csign{x}	$\text{csign}(x)$	X\deg	X°
\Oh{N}	$\mathcal{O}(N)$	\oh{N}	$o(N)$	\st	s.t.
\ow	otherwise	\ew	elsewhere	\eg	$e.g.$
\ie	$i.e.$	\etal	$et\ al.$	\etc	$etc.$
\viz	$viz.$	\d{y}	$\text{d}y$		

5.11 Basic text colors

Syntax	Description	Syntax	Description	Syntax	Description
\white{text}		\black{text}	text	\red{text}	text
\green{text}	text	\blue{text}	text	\cyan{text}	text
\magenta{text}	text	\yellow{text}	text		

5.12 Special colors that comes with [dvipsnames] option in xcolor package

Syntax	Description	Syntax	Description	Syntax	Description
\Apricot{text}	text	\Aquamarine{text}	text	\Bittersweet{text}	text
\Black{text}	text	\Blue{text}	text	\BlueGreen{text}	text
\BlueViolet{text}	text	\BrickRed{text}	text	\Brown{text}	text
\BurntOrange{text}	text	\CadetBlue{text}	text	\CarnationPink{text}	text
\Cerulean{text}	text	\CornflowerBlue{text}	text	\Cyan{text}	text
\Dandelion{text}	text	\DarkOrchid{text}	text	\Emerald{text}	text
\ForestGreen{text}	text	\Fuchsia{text}	text	\Goldenrod{text}	text
\Gray{text}	text	\Green{text}	text	\GreenYellow{text}	text
\JungleGreen{text}	text	\Lavender{text}	text	\LimeGreen{text}	text
\Magenta{text}	text	\Mahogany{text}	text	\Maroon{text}	text
\Melon{text}	text	\MidnightBlue{text}	text	\Mulberry{text}	text
\NavyBlue{text}	text	\OliveGreen{text}	text	\Orange{text}	text
\OrangeRed{text}	text	\Orchid{text}	text	\Peach{text}	text
\Periwinkle{text}	text	\PineGreen{text}	text	\Plum{text}	text
\ProcessBlue{text}	text	\Purple{text}	text	\RawSienna{text}	text
\Red{text}	text	\RedOrange{text}	text	\RedViolet{text}	text
\Rhodamine{text}	text	\RoyalBlue{text}	text	\RoyalPurple{text}	text
\RubineRed{text}	text	\Salmon{text}	text	\SeaGreen{text}	text
\Sepia{text}	text	\SkyBlue{text}	text	\SpringGreen{text}	text
\Tan{text}	text	\TealBlue{text}	text	\Thistle{text}	text
\Turquoise{text}	text	\Violet{text}	text	\VioletRed{text}	text
\White{text}		\WildStrawberry{text}	text	\Yellow{text}	text
\YellowGreen{text}	text	\YellowOrange{text}	text		

6 Theorem-like environments

6.1 Theorems

```
\begin{theorem}\label{thm:1}
    \mylipsum
\end{theorem}
```

Theorem 1. *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.*

6.2 Definitions

```
\begin{definition}\label{def:1}
    \mylipsum
\end{definition}
```

Definition 1. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.

6.3 Propositions

```
\begin{proposition}\label{prop:1}
    \mylipsum
\end{proposition}
```

Proposition 1. *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.*

6.4 Lemmas

```
\begin{lemma}\label{lem:1}
    \mylipsum
\end{lemma}
```

Lemma 1. *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.*

6.5 Corollaries

```
\begin{corollary}\label{cor:1}
    \mylipsum
\end{corollary}
```

Corollary 1. *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.*

6.6 Examples

```
\begin{example}\label{exm:1}
    \mylipsum
\end{example}
```

Example 1. *Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl.*

6.7 Remarks

```
\begin{remark}\label{rem:1}
    \mylipsum
\end{remark}
```

Remark 1. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent luctus sem nibh, et venenatis mauris aliquet et. Sed velit nisl. ∎

Referencing

```
Lorem ipsum dolor sit amet \underline{Theorem \ref{thm:1}}, consectetur adipiscing
↪   elit. In vel orci id est porta laoreet at non nisl. Pellentesque habitant morbi
↪   tristique senectus et netus et malesuada fames ac turpis egestas
↪   \underline{Definition \ref{def:1}}. Maecenas posuere augue nec turpis pretium
↪   faucibus \underline{Proposition \ref{prop:1}}. Pellentesque dui massa, facilisis
↪   eu placerat sit amet, tincidunt sit amet nisl. In pellentesque molestie ipsum at
↪   dictum \underline{Lemma \ref{lem:1}}. Curabitur libero metus, eleifend porta
↪   finibus eu, sagittis nec lorem. Maecenas ante quam, faucibus cursus erat vel,
↪   accumsan dictum eros \underline{Corollary \ref{cor:1}}. Quisque commodo libero
↪   quis enim laoreet congue. Quisque sed egestas quam. In posuere malesuada mollis
↪   \underline{Example \ref{exm:1}}.
```

Lorem ipsum dolor sit amet Theorem 1, consectetur adipiscing elit. In vel orci id est porta laoreet at non nisl. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas Definition 1. Maecenas posuere augue nec turpis pretium faucibus Proposition 1. Pellentesque dui massa, facilisis eu placerat sit amet, tincidunt sit amet nisl. In pellentesque molestie ipsum at dictum Lemma 1. Curabitur libero metus, eleifend porta finibus eu, sagittis nec lorem. Maecenas ante quam, faucibus cursus erat vel, accumsan dictum eros Corollary 1. Quisque commodo libero quis enim laoreet congue. Quisque sed egestas quam Remark 1. In posuere malesuada mollis Example 1.

6.8 Subsec

The following is an example of a `subsec`. It is like a subsection but do not create any new numbering. It just creates a new paragraph with the argument as the title of the paragraph. Some texts are required before calling the `subsec` command as it always invokes a `newline`.

Example does this.

```
\subsec{Example} does this.
```

7 Algorithm

```
\begin{algorithm}[H]
    \caption{\textsc{ExampleAlgorithm}}\label{alg:1}
    \begin{algorithmic}[1]
        \Require \texttt{var1}, \texttt{var2}, $N$
        \Ensure \texttt{var1} $\gets$ 1, \texttt{var2} $\gets$ 1, \texttt{flag} $\gets$ 0
        \Input \texttt{var1}, \texttt{var2}, $N$
        \Init \texttt{var1} $\gets$ 1, \texttt{var2} $\gets$ 1, \texttt{flag} $\gets$ 0
        \Output \texttt{var3}
        \Comment All five commands are equally valid
        \Repeat \Comment{Example: \texttt{repeat}}
            \State \textsc{SomeSteps}
        \Until \textsc{SomeConditionIsMet}
        \For{$i=0$ \To $10$} \Comment{Example: \texttt{for} loop}
            \State \textsc{SomeStepsForLoop}
        \EndFor
        \While{\texttt{flag}} \Comment{Example: \texttt{while} loop}
            \State \texttt{var1} $\gets$ \textsc{DoSomeShit}
            \State \texttt{var2} $\gets$ \textsc{DoSomeMoreShit}
        \EndWhile
        \Loop \Comment{Example: \texttt{loop}}
            \State \textsc{SomeInfiniteLoopStuff}
        \EndLoop
        \If{\texttt{var1} $< N$}\Comment{Example: \texttt{if-else if- else}}
            \State \texttt{flag} $\gets 1$
        \ElsIf{\texttt{var1} $= N$}
            \State \texttt{flag} $\gets 0$
        \Else
            \State \texttt{var3} $\gets$ \texttt{var1} $+$ \texttt{var2}
        \EndIf
        \State \Print{some results}
        \State \Return \texttt{var3}
    \end{algorithmic}
\end{algorithm}
```

Algorithm 1 EXAMPLEALGORITHM

Require: var1, var2, N
Ensure: var1 ← 1, var2 ← 1, flag ← 0
Input: var1, var2, N
Initialize: var1 ← 1, var2 ← 1, flag ← 0
Output: var3   ▷ All five commands are equally valid
 1: **repeat**   ▷ Example: repeat
 2:     SOMESTEPS
 3: **until** SOMECONDITIONISMET
 4: **for** $i = 0$ **to** 10 **do**   ▷ Example: for loop
 5:     SOMESTEPSFORLOOP
 6: **end for**
 7: **while** flag **do**   ▷ Example: while loop
 8:     var1 ← DOSOMESHIT
 9:     var2 ← DOSOMEMORESHIT
10: **end while**
11: **loop**   ▷ Example: loop
12:     SOMEINFINITELOOPSTUFF
13: **end loop**
14: **if** var1 $< N$ **then**   ▷ Example: if-else if- else
15:     flag ← 1
16: **else if** var1 $= N$ **then**
17:     flag ← 0
18: **else**
19:     var3 ← var1 + var2
20: **end if**
21: **print** some results
22: **return** var3

---

8 Underbrace inside a matrix environment

Short usage: \undermat{arg1}{arg2}
For example:

$$
\boldsymbol{J}_k =
\begin{bmatrix}
0 & \dots & 0 & 1 & \dots & 0 \\
\vdots & & & & \ddots & \\
& & & & & 1 \\
\underbrace{0 \quad \dots \quad 0}_{k} & & & \dots & &
\end{bmatrix}
$$

Code:

```
\begin{align*}
\bJ_k =
    \begin{bmatrix}
        0               & \dots & 0      & 1      & \dots  & 0 \\
        \vdots          &       &        &        & \ddots &   \\
                        &       &        &        &        & 1 \\
        \undermat{0     & \dots & 0}{k}  & \dots  &        &   \\
    \end{bmatrix}
\end{align*}
```