

The ShorTeX package

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Updated June 12, 2024

Abstract

The purpose of the ShorTeX (meta)package is to make the process of typesetting typical mathematical documents in L^AT_EX more efficient, and the resulting code easier to read. It achieves this by (1) providing an extensive, internally consistent, and easy to learn set of macro shorthands and custom commands, and (2) incorporating a set of packages that are dedicated to reducing manual coding effort.

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1 Usage and package options

Put a copy of `shortex.sty` in the folder alongside your other document files, and include ShorTeX in the document by adding `\usepackage{shortex}` to the preamble. **Do not install ShorTeX system-wide**; this package has not yet reached a stable version 1.0, and we are updating things regularly without any guarantee of backwards compatibility. **You must compile your document 4 times when using ShorTeX** to ensure that equation numbers and references update properly.

ShorTeX will include and configure the following packages for you: `xcolor`, `nicefrac`, `cleverref`, `hyperref`, `graphicx`, `autonum`. ShorTeX also includes the following packages (with no configuration):

- **math-related:** `mathrsfs`, `dsfont`, `amsmath`, `amssymb`, `amsthm`, `bm`, `bbm`, `amsfonts`, `mathtools`, `thmtools`
- **figures, tables, etc.:** `caption`, `subcaption`, `wrapfig`, `algorithm`, `algpseudocode`, `multirow`
- **referencing and linking:** `xr-hyper`, `crossreftools`, `import`, `subfiles`, `url`
- **miscellaneous:** `microtype`, `xifthen`, `xstring`, `xspace`,

So, you do not need to explicitly include and/or set any of these up yourself. If you are writing a document that must use a specific style file (e.g., for a conference or journal) that itself includes some of these packages, we recommend editing those style files to remove the package imports.

The ShorTeX package has a few options:

`noautonum` Do not include `autonum.sty`. This disables automatic equation numbering.

`blacklinks` Switch hyperlinks, citations, references, etc. to be typeset in black font. The default is dark blue.

`draft` Turn on draft mode for `graphicx`, `hyperref` (with placeholder figures etc).

`nomathfontdefaults` Disable default font style/accent combinations (see Section 3 for details).

commenters Specify names of commenters for comment commands (see Section [4](#) for details).

hidecomments Suppress comments (see Section [4](#) for details).

2 Environments

L^AT_EX documents often include a lot of verbose code related to creating environments (`\begin{blah}... \end{blah}`). ShorTeX provides a set of shortened macros for common environments. Each shortened begin and end command starts with `\b...` and `\e...`, respectively. Note that all theorem-like environments (theorem, lemma, proposition, etc.) are numbered by default; unnumbered versions can be obtained by appending a `u`. For example, `\bthmu... \ethmu` creates an unnumbered theorem environment, while `\blemu... \elemu` creates an unnumbered lemma environment.

| Environment | Syntax |
|--|---|
| abstract | <code>\babs... \eabs</code> |
| itemize | <code>\bitem... \eitem</code> |
| enumerate | <code>\benum... \eenum</code> |
| description | <code>\bdesc... \edesc</code> |
| algorithm | <code>\balg... \ealg</code> |
| algorithmic | <code>\balgc... \ealgc</code> |
| table | <code>\btabs... \etabs</code> |
| subtable | <code>\bsubtab... \esubtab</code> |
| tabular | <code>\btabr... \etabr</code> |
| figure | <code>\bfig... \efig</code> |
| figure* | <code>\bfigs... \efigs</code> |
| subfigure | <code>\bsubfig... \esubfig</code> |
| center | <code>\bcent... \ecent</code> |
| align | <code>\[... \]</code> |
| inline math | <code>\$... \$</code> |
| <i>Note: These are numbered theorem-like environments.</i> | |
| <i>For unnumbered, append a <code>u</code>: e.g., <code>\bthmu... \ethmu</code>.</i> | |
| theorem | <code>\bthm... \ethm</code> |
| lemma | <code>\blem... \elem</code> |
| proposition | <code>\bprop... \eprop</code> |
| corollary | <code>\bcor... \ecor</code> |
| conjecture | <code>\bconj... \econj</code> |
| definition | <code>\bdefn... \edefn</code> |
| assumption | <code>\bassum... \eassum</code> |
| example | <code>\bexa... \eexa</code> |
| remark | <code>\brmk... \ermk</code> |
| fact | <code>\bfact... \efact</code> |
| exercise | <code>\bexer... \eexer</code> |
| proof | <code>\bprf... \eprf</code> |
| proofof | <code>\bprfof{\cref{theorem_label}}... \eprf</code> |
| matrix | <code>\bmat... \emat</code> |
| bmatrix | <code>\bbmat... \ebmat</code> |
| pmatrix | <code>\bpmat... \epmat</code> |

3 Math font styles and accents

Applying accents (e.g., hats \hat{a} , tildes \tilde{a} , bars \bar{a}) and changing fonts (e.g., double-stroke \mathbb{A} , caligraphic \mathcal{A} , and bold \mathbf{A}) is quite cumbersome in standard L^AT_EX. For example, the code to make a tilde caligraphic A, $\tilde{\mathcal{A}}$ is `\widetilde{\mathcal{A}}`. By itself that code is not too bad, but many such characters in a large mathematical expression results in unreadable code.

3.1 Default font, accent combinations

ShorTeX defines an efficient syntax for changing math fonts and applying accents to characters. The syntax takes the form `\s<modifiers>character`, where `<modifiers>` is a set of single characters that represent font/accident modifications to `character`. For example, the code for tilde caligraphic A is `\stcA` where `t` represents “tilde,” `c` represents “caligraphic,” and `A` is the character to typeset. The table below shows the modifier characters that are implemented by default with all upper/lowercase Greek and Roman characters. Because `b` is already used for “bar,” ShorTeX uses `k` for “bold” (arising from the use of `k` to represent “black” in plotting packages across many languages, which itself arises from the “K” in CMYK).

| Style | Modifier | Example | Typeset Example |
|---------------------------------------|----------------|-------------------|-----------------|
| caligraphic (<code>\mathcal</code>) | <code>c</code> | <code>\scA</code> | \mathcal{A} |
| bold (<code>\mathbf</code>) | <code>k</code> | <code>\skA</code> | \mathbf{A} |
| doublestroke (<code>\mathbb</code>) | <code>d</code> | <code>\sdA</code> | \mathbb{A} |
| Accent | Modifier | Example | Typeset Example |
| hat (<code>\widehat</code>) | <code>h</code> | <code>\shA</code> | \hat{A} |
| tilde (<code>\widetilde</code>) | <code>t</code> | <code>\stA</code> | \tilde{A} |
| bar (<code>\widebar</code>) | <code>b</code> | <code>\sbA</code> | \bar{A} |
| dot (<code>\dot</code>) | <code>o</code> | <code>\soA</code> | \dot{A} |

In addition, ShorTeX allows the use of combinations of any one of the above fonts with any one of the above accents. For example, we can combine the caligraphic style `c` with all the accents via `\stcA`, `\socA`, `\sbcA`, `\shcA`:

$$\tilde{\mathcal{A}} \quad \dot{\mathcal{A}} \quad \bar{\mathcal{A}} \quad \hat{\mathcal{A}}.$$

To disable these default shortcuts, pass the `\nomathfontdefaults` option to ShorTeX.

3.2 Advanced usage: flexible font, accent combinations

For most users, the default font style/accident combinations that come with ShorTeX will suffice. However, the `\s...` commands are actually implemented under the hood using a more flexible `\s[modifiers]character` command that

can take a wide variety of combinations of font/accent modifiers. For example, the code for tilde caligraphic A is `\s[tc]A` where `t` represents “tilde,” `c` represents “caligraphic,” and `A` is the character to typeset.

| Style | Modifier | Example | Typeset Example |
|---------------------------------------|----------------|---------------------|-----------------|
| caligraphic (<code>\mathcal</code>) | <code>c</code> | <code>\s[c]A</code> | \mathcal{A} |
| bold (<code>\mathbf</code>) | <code>k</code> | <code>\s[k]A</code> | \mathbf{A} |
| doublestroke (<code>\mathbb</code>) | <code>d</code> | <code>\s[d]A</code> | \mathbb{A} |
| fraktur (<code>\mathfrak</code>) | <code>f</code> | <code>\s[f]A</code> | \mathfrak{A} |
| Accent | Modifier | Example | Typeset Example |
| hat (<code>\widehat</code>) | <code>h</code> | <code>\s[h]A</code> | \widehat{A} |
| tilde (<code>\widetilde</code>) | <code>t</code> | <code>\s[t]A</code> | \widetilde{A} |
| bar (<code>\widebar</code>) | <code>b</code> | <code>\s[b]A</code> | \widebar{A} |
| dot (<code>\dot</code>) | <code>o</code> | <code>\s[o]A</code> | \dot{A} |

These style modifiers can be combined; the underlying code is flexible enough that it will happily produce a wide variety of combinations, including those that aren’t very sensible.

Note: modifiers are applied in the reverse of the order in which they appear; the modifier furthest to the right is applied first. This matches the order that the corresponding commands would appear in TeX code.

| Style/Accent | Modifier | Example | Typeset Example |
|-------------------|-----------------|----------------------|---------------------------|
| caligraphic tilde | <code>ct</code> | <code>\s[ct]A</code> | $\widetilde{\mathcal{A}}$ |
| bold hat | <code>kh</code> | <code>\s[kh]A</code> | $\widehat{\mathbf{A}}$ |
| tilde hat | <code>ht</code> | <code>\s[ht]A</code> | $\widehat{\widetilde{A}}$ |
| hat tilde | <code>th</code> | <code>\s[th]A</code> | $\widetilde{\widehat{A}}$ |
| fraktur dot | <code>of</code> | <code>\s[of]A</code> | $\dot{\mathfrak{A}}$ |

The default `\s...` commands included in ShorTeX are compiled in advance from the more general `\s[...]` via the `\parsefontstylestrings` command; this lets us avoid having to type `[]` for common style/accent combinations. For example, if we use “bold hat” symbols frequently, we might want to use commands like `\skh...` instead of `\s[kh]...`. We can accomplish this using the `\parsefontstylestrings` command, with syntax

```
\parsefontstylestrings{<fstr1>}{<fstr2>...}{<alphabet>}
```

For example, to define “bold hat” and “caligraphic hat” styles for the characters A, B, C, and D, we would use the command

```
\parsefontstylestrings{{kh}{ch}}{ABCD}
```

and then in the L^AT_EX document, use the commands `\skhA` `\skhB` `\skhC` `\skhD` and `\schA` `\schB` `\schC` `\schD` to obtain the following symbols:

$$\hat{A}\hat{B}\hat{C}\hat{D}\hat{A}\hat{B}\hat{C}\hat{D}$$

As another example, for “bold hat” applied to α , β , and γ , we would use the syntax

```
\parsefontstylestrings{{kh}}{{\alpha}{\beta}{\gamma}}
```

and then in the L^AT_EX document, use the commands `\skhalpha` `\skhbeta` `\skhgamma` to obtain the following symbols:

$$\hat{\alpha}\hat{\beta}\hat{\gamma}$$

For convenience we also provide a few common alphabets of symbols for use in the `\parsefontstylestrings` command. Note that not every Greek character has a lowercase or uppercase version (in cases where it is identical to its Roman counterpart). Also note that we use ShorTeX Greek letter syntax; see Section 6.2.

| Syntax | Characters |
|------------------------------|--|
| <code>\lowercaseRoman</code> | abcdefghijklmnopqrstuvwxyz |
| <code>\uppercaseRoman</code> | ABCDEFGHIJKLMNOPQRSTUVWXYZ |
| <code>\lowercaseGreek</code> | alpha,beta,gamma,delta,eps,zeta, eta,theta,iota,kappa,lam,mu,nu,xi,pi,rho, sigma,tau,ups,phi,chi,psi,omega,veps,vtheta, vkappa,vpi,vrho,vsigma,vphi |
| <code>\uppercaseGreek</code> | Gamma,Delta,Theta,Lam,Xi, Pi,Sigma,Ups,Phi,Psi,Omega |

4 Commenting

ShorTeX defines four types of document markup that can be used: *comment*, *emphasized comment*, *margin comment*, and *highlight*. This is a lightweight alternative to some more common todo packages (e.g., `todonotes`). In order to create comments, you must pass the `commenters` option to the package, and specify an identifier for each commenter. For example, one could specify three commenters (named A, B, C) using the command

```
\usepackage[commenters={A,B,C}]{shorTeX}
```

For each commenter, there are four commands (one for each markup type). The table below contains examples for commenter “A”. Notice that each comment is tagged with a number (specific to each commenter) for easy referencing.

| Comment Type | Syntax | Example | Typeset Example |
|----------------------|-----------------------------|------------------------------|-----------------------|
| comment | <code>\c...{comment}</code> | <code>\cA{hello!}</code> | (A1) hello! |
| emphasized comment | <code>\e...{comment}</code> | <code>\eA{hello!}</code> | (A2) hello! |
| margin comment | <code>\m...{comment}</code> | <code>text\mA{hello!}</code> | text (A3) (A3) hello! |
| float margin comment | <code>\f...{comment}</code> | <code>text\fA{hello!}</code> | text (A4) (A4) hello! |
| highlight | <code>\h...{text}</code> | <code>\hA{text}</code> | text |

The margin comment cannot be used within a float but behaves well when there are multiple margin comments close together. The float margin comment can be used within a float but multiple ones close together can overlap and become unreadable.

Note that each commenter gets their own color. Currently ShorTeX supports nine different commenter colors, and will wrap around back to the first color if the number of commenters exceeds nine:

- (A5) example(A6) **emphasized example**more text (A7) (A8) (A7) margin example
- (B1) example(B2) **emphasized example**more text (B3) (A8) margin example which won't overlap
- (C1) example(C2) **emphasized example**more text (C3) (B3) margin example
- (D1) example(D2) **emphasized example**more text (D3) (C3) margin example
- (E1) example(E2) **emphasized example**more text (E3) (D3) margin example
- (F1) example(F2) **emphasized example**more text (F3) (E3) margin example
- (G1) example(G2) **emphasized example**more text (G3) (F3) margin example
- (H1) example(H2) **emphasized example**more text (H3) (G3) margin example
- (I1) example(I2) **emphasized example**more text (I3) (H3) margin example
- Back to first color: (J1) example(J2) **emphasized example**more text (J3) (J4) (I3) margin example

You can also disable all comments to see a clean version of the current document using the `hidecomments` package option. This option will blank out all comments and render highlighted text normally.

5 Referencing figures, equations, tables, etc.

ShorTeX includes the `cleveref` package, which simplifies the process of typesetting references. Use the `\cref` command (or `\Cref` at the beginning of a sentence) to automatically typeset the names of the objects you reference (including properly handling multiple references). For example, if `\label{fig:first}` is applied to the first figure in the document,

`In \cref{fig:first}, you can see...`

would typeset as “In Fig. 1, you can see...” Similarly, if `\label{thm:first}` references a theorem and `\label{second_result}` references a lemma,

`\cref{thm:first,lem:second} show that...`

will typeset as “Theorem 1 and Lemma 2 show that...” This works for many different reference types (Figure, Algorithm, Equation, Table, etc), and can be extended if needed. See the `cleveref` documentation at <https://ctan.org/pkg/cleveref?lang=en> and the homepage at <https://www.dr-qubit.org/cleveref.html> for more information.

ShorTeX also includes the `autonum` package, which simplifies the process of equation numbering. Typically when you typeset equations, you have to choose between `$. . . $`, `$$. . . $$`, `\begin{align} . . . \end{align}`, `\begin{aligned} . . . \end{aligned}`, `\begin{equation} . . . \end{equation}`, not to mention starred versions of those environments and `\nonumber`/`\notag` commands, depending on whether/where you want equation numbers,

The `autonum` package automatically decides which equations to provide numbers based on *which equations you reference*. So when using ShorTeX, you only need two commands for math mode: single dollar signs `$. . . $` for inline math, and `align` environments (redefined in ShorTeX to be `\[. . . \]`) for display math.¹

For example, if you create the following display math,

```
\[
  a+b = c \label{eq:the_equation}
\]
```

then if you use the command `\cref{eq:the_equation}` somewhere in the document, that equation will automatically be assigned a number. If not, it won't get a number. See the `autonum` package documentation <https://ctan.org/pkg/autonum?lang=en> for more information.

¹There are differences between how `align` and other math display environments typeset equations. I have not ever encountered a case where it mattered much. If you are very picky about typesetting, note that ShorTeX does not *disable* any functionality, so you can use other environments anywhere you feel it is necessary.

6 Math mode macros

6.1 Delimiters

Mathematics in L^AT_EX often includes quite a few delimiters (parentheses, brackets, curly brackets, etc.). A very common usage of these involves the `\left... \right` commands for automatic sizing, as well as `\middle` for sizing characters in between delimiters. One can also use `\bigl... \bigr`, `\Bigl... \Bigr`, `\biggl... \biggr`, `\Biggl... \Biggr` to control sizing manually. ShorTeX creates shorthands for these.

| Description | Syntax |
|-----------------------|--------------------------|
| automatic left, right | <code>\lt...\rt</code> |
| automatic middle | <code>\m...</code> |
| big | <code>\lb...\rb</code> |
| Big | <code>\lB...\rB</code> |
| bigg | <code>\lbg...\rbg</code> |
| Bigg | <code>\lBg...\rBg</code> |

These can be applied to all the usual delimiter characters. The following tables demonstrate usage for automatically sized delimiters.

| Description | Example | Text style | Display style |
|-----------------|--|--|--|
| parentheses | <code>\lt(\frac{x}{y}\rt)</code> | $\left(\frac{x}{y}\right)$ | $\left(\frac{x}{y}\right)$ |
| curly brackets | <code>\lt{\frac{x}{y}\rt\}</code> | $\left\{\frac{x}{y}\right\}$ | $\left\{\frac{x}{y}\right\}$ |
| square brackets | <code>\lt[\frac{x}{y}\rt]</code> | $\left[\frac{x}{y}\right]$ | $\left[\frac{x}{y}\right]$ |
| pipes | <code>\lt \frac{x}{y}\rt </code> | $\left \frac{x}{y}\right $ | $\left \frac{x}{y}\right $ |
| double pipes | <code>\lt \frac{x}{y}\rt </code> | $\left\ \frac{x}{y}\right\ $ | $\left\ \frac{x}{y}\right\ $ |
| angle brackets | <code>\lt<\frac{x}{y}\rt></code> | $\left\langle\frac{x}{y}\right\rangle$ | $\left\langle\frac{x}{y}\right\rangle$ |
| middle bar | <code>\E\lt[X \m Y\rt]</code> | $\mathbb{E}[X Y]$ | $\mathbb{E}[X Y]$ |

Also note that the spacing around the standard `\left... \right...` delimiters is sometimes a bit odd. For example, the code `\operatorname{A}\left(x\right)` adds too much space between A and the parentheses:

$$A(x)$$

ShorTeX's shorthands `\lt...` and `\rt...` fix this. The code `\operatorname{A}\lt(x\rt)` typesets as

$$A(x)$$

The code for the spacing fixes was taken from <https://tex.stackexchange.com/questions/2607/spacing-around-left-and-right>, which itself originally arose from Heiko Oberdiek on the COMP.TEXT.TEX newsgroup (<https://groups.google.com/group/comp.text.tex/msg/257aa6119bef878b>) and is now in the `mleftright` package.

ShorTeX also provides a set of common paired delimiters:

| Description | Syntax | Text style | Display style |
|-----------------|--|--|--|
| Round brackets | <code>\rbra{\frac{x}{y}}</code> | $(\frac{x}{y})$ | $(\frac{x}{y})$ |
| Curly brackets | <code>\cbra{\frac{x}{y}}</code> | $\{\frac{x}{y}\}$ | $\{\frac{x}{y}\}$ |
| Square brackets | <code>\sbra{\frac{x}{y}}</code> | $[\frac{x}{y}]$ | $[\frac{x}{y}]$ |
| Norm | <code>\norm{\frac{x}{y}}</code> | $\ \frac{x}{y}\ $ | $\ \frac{x}{y}\ $ |
| Inner product | <code>\inner{\frac{x}{y},\frac{y}{z}}</code> | $\langle \frac{x}{y}, \frac{y}{z} \rangle$ | $\langle \frac{x}{y}, \frac{y}{z} \rangle$ |
| Absolute value | <code>\abs{\frac{x}{y}}</code> | $ \frac{x}{y} $ | $ \frac{x}{y} $ |
| Floor | <code>\floor{\frac{x}{y}}</code> | $\lfloor \frac{x}{y} \rfloor$ | $\lfloor \frac{x}{y} \rfloor$ |
| Ceiling | <code>\ceil{\frac{x}{y}}</code> | $\lceil \frac{x}{y} \rceil$ | $\lceil \frac{x}{y} \rceil$ |

These paired delimiters are defined using the `\DeclarePairedDelimiter` command, so one can use an asterisk for automatic sizing, or place a size specification in square brackets. For example, `\rbra{\frac{x}{y}}`, `\rbra*{\frac{x}{y}}`, and `\rbra[\Bigg]{\frac{x}{y}}` typeset, respectively, as

$$(\frac{x}{y}), \quad \left(\frac{x}{y}\right), \quad \left(\frac{x}{y}\right).$$

6.2 Greek characters and variants

ShorTeX defines shorthands for Greek letters with more than 5 characters in their name (`\epsilon`, `\lambda`, `\upsilon`) as well as variant characters. Variants are obtained by preceding the usual command with `\v`...

| Letter | Syntax | Symbol |
|---------|---------------------------------------|----------------------|
| epsilon | <code>\eps</code> | ϵ |
| lambda | <code>\lam</code> , <code>\Lam</code> | λ, Λ |
| upsilon | <code>\ups</code> , <code>\Ups</code> | υ, Υ |

| Letter | Variant Syntax | Variant Symbol |
|---------|----------------------|----------------|
| epsilon | <code>\veps</code> | ε |
| theta | <code>\vtheta</code> | ϑ |
| kappa | <code>\vkappa</code> | \varkappa |
| pi | <code>\vpi</code> | ϖ |
| rho | <code>\vrho</code> | ϱ |
| sigma | <code>\vsigma</code> | ς |
| phi | <code>\vphi</code> | φ |

6.3 Sets and set operations

| Name | Syntax | Symbol |
|----------------------|----------------------|-------------------------|
| reals | <code>\reals</code> | \mathbb{R} |
| extended reals | <code>\xreals</code> | $\overline{\mathbb{R}}$ |
| rational numbers | <code>\rats</code> | \mathbb{Q} |
| integers | <code>\ints</code> | \mathbb{Z} |
| natural numbers | <code>\nats</code> | \mathbb{N} |
| complex numbers | <code>\comps</code> | \mathbb{C} |
| measures | <code>\msrs</code> | \mathcal{M} |
| probability measures | <code>\pmsrs</code> | \mathcal{M}_1 |
| intersection | <code>\inter</code> | \cap |
| union | <code>\union</code> | \cup |
| volume | <code>\vol</code> | vol |
| diameter | <code>\diam</code> | diam |
| boundary | <code>\bdry</code> | ∂ |
| closure | <code>\cl</code> | cl |
| span | <code>\spann</code> | span |
| cone | <code>\cone</code> | cone |
| convex hull | <code>\conv</code> | conv |

6.4 Linear algebra

| Name | Syntax | Symbol |
|-------------------|-----------------------|------------------|
| trace | <code>\tr A</code> | $\text{tr } A$ |
| rank | <code>\rank A</code> | $\text{rank } A$ |
| transpose | <code>A\T</code> | A^\top |
| inverse transpose | <code>A\nT</code> | $A^{-\top}$ |
| diagonal | <code>\diag A</code> | $\text{diag } A$ |
| adjoint | <code>A\adj</code> | A^\dagger |
| spectrum | <code>\spec A</code> | σA |
| kroncker product | <code>A\kron B</code> | $A \otimes B$ |

6.5 Calculus

| Name | Syntax | Symbol |
|------------------------------------|-----------------------------|--|
| differential symbol | <code>\d x</code> | dx |
| partial differential symbol | <code>\pd x</code> | ∂x |
| gradient symbol | <code>\grad f</code> | ∇f |
| derivative | <code>\der{x}{y}</code> | $\frac{dx}{dy}$ |
| n^{th} derivative | <code>\der[n]{x}{y}</code> | $\frac{d^n x}{dy^n}$ |
| derivative w.r.t. | <code>\der{}{y}</code> | $\frac{d}{dy}$ |
| partial derivative | <code>\pder{x}{y}</code> | $\frac{\partial x}{\partial y}$ |
| n^{th} partial derivative | <code>\pder[n]{x}{y}</code> | $\frac{\partial^n x}{\partial y^n}$ |
| partial derivative w.r.t. | <code>\pder{}{y}</code> | $\frac{\partial}{\partial y}$ |
| Hessian | <code>\hes{x}{y}{z}</code> | $\frac{\partial^2 x}{\partial y \partial z}$ |
| Hessian w.r.t. | <code>\hes{}{y}{z}</code> | $\frac{\partial^2}{\partial y \partial z}$ |

6.6 General probability and statistics

| Name | Syntax | Symbol |
|-----------------------------|-----------------------------|------------------------|
| i.i.d. | <code>\iid</code> | i.i.d. |
| almost sure | <code>\as</code> | a.s. |
| almost everywhere | <code>\aev</code> | a.e. |
| convergence almost surely | <code>\convas</code> | $\xrightarrow{a.s.}$ |
| convergence in probability | <code>\convp</code> | \xrightarrow{p} |
| convergence in distribution | <code>\convd</code> | \xrightarrow{d} |
| equality in distribution | <code>\eqd</code> | $\stackrel{d}{=}$ |
| equality almost surely | <code>\eqas</code> | $\stackrel{a.s.}{=}$ |
| probability | <code>\P</code> | \mathbb{P} |
| expectation | <code>\E</code> | \mathbb{E} |
| variance | <code>\Var</code> | Var |
| covariance | <code>\Cov</code> | Cov |
| correlation | <code>\Corr</code> | Corr |
| support | <code>\supp</code> | supp |
| distributed as | <code>\dist</code> | \sim |
| distributed i.i.d. | <code>\distiid</code> | $\stackrel{iid}{\sim}$ |
| distributed independently | <code>\distind</code> | $\stackrel{ind}{\sim}$ |
| independent | <code>\indep</code> | $\perp\!\!\!\perp$ |
| Kullback-Leibler divergence | <code>\KL(q p)</code> | $KL(q p)$ |
| Total variation distance | <code>\TV(q,p)</code> | $TV(q,p)$ |
| ν -Wasserstein distance | <code>\Wass_\nu(q,p)</code> | $W_\nu(q,p)$ |
| Hellinger distance | <code>\Hell(q,p)</code> | $H(q,p)$ |

6.7 Probability distributions

| Name | Syntax | Symbol |
|--------------------------------------|------------------------|----------------|
| Bernoulli | <code>\Bern</code> | Bern |
| beta | <code>\Beta</code> | Beta |
| beta prime | <code>\Beta'</code> | Beta' |
| binomial | <code>\Binom</code> | Binom |
| categorical | <code>\Cat</code> | Categorical |
| Cauchy | <code>\Cauchy</code> | Cauchy |
| chi-squared | <code>\ChiSq</code> | χ^2 |
| Dirichlet | <code>\Dir</code> | Dir |
| exponential | <code>\Exp</code> | Exp |
| gamma | <code>\Gam</code> | Gam |
| inverse gamma | <code>\InvGam</code> | InvGam |
| geometric | <code>\Geom</code> | Geom |
| Gumbel | <code>\Gum</code> | Gumbel |
| generalized extreme value | <code>\GEV</code> | GEV |
| Laplace | <code>\Lap</code> | Lap |
| multinomial | <code>\Multi</code> | Multi |
| normal | <code>\Norm</code> | \mathcal{N} |
| Poisson | <code>\Poiss</code> | Poiss |
| student-t | <code>\StudentT</code> | \mathcal{T} |
| uniform | <code>\Unif</code> | Unif |
| von Mises-Fisher | <code>\VMF</code> | vMF |
| Wishart | <code>\Wish</code> | \mathcal{W} |
| inverse Wishart | <code>\InvWish</code> | \mathcal{IW} |
| Bernoulli process | <code>\BeP</code> | BeP |
| beta process | <code>\BP</code> | BP |
| beta prime process | <code>\BPP</code> | BPP |
| Dirichlet process | <code>\DP</code> | DP |
| Chinese restaurant process | <code>\CRP</code> | CRP |
| completely random measure | <code>\CRM</code> | CRM |
| normalized completely random measure | <code>\NCRM</code> | NCRM |
| gamma process | <code>\GamP</code> | ΓP |
| normalized gamma process | <code>\NGamP</code> | N ΓP |
| Gaussian process | <code>\GP</code> | GP |
| Pitman-Yor process | <code>\PYP</code> | PY |
| Poisson process | <code>\PP</code> | PP |

6.8 Text in math

| Name | Syntax | Symbol |
|-------|-------------------------|---------------|
| s.t. | <code>x \st y</code> | x s.t. y |
| and | <code>x \andd y</code> | x and y |
| or | <code>x \orrr y</code> | x or y |
| with | <code>x \with y</code> | x with y |
| where | <code>x \where y</code> | x where y |

6.9 Other

| Name | Syntax | Symbol |
|-----------|------------------------------------|--|
| argmax | <code>\argmax_{x\in \reals}</code> | $\arg \max_{x \in \mathbb{R}}$ |
| argmin | <code>\argmin_{x\in \reals}</code> | $\arg \min_{x \in \mathbb{R}}$ |
| esssup | <code>\esssup_{x\in \reals}</code> | $\operatorname{ess\,sup}_{x \in \mathbb{R}}$ |
| essinf | <code>\essinf_{x\in \reals}</code> | $\operatorname{ess\,inf}_{x \in \mathbb{R}}$ |
| indicator | <code>\1[x=3]</code> | $\mathbf{1}[x = 3]$ |
| sign | <code>\sgn x</code> | $\operatorname{sgn} x$ |

6.10 Shrinking whitespace in math

The command `\squish{<frac>}` in math mode enables you to shrink whitespace in mathematics, where `<frac>` represents the fraction of whitespace reduction. Below, the first line is regularly spaced, the second line has `\squish{0.5}`, and the third has `\squish{0.0}`.

$$\begin{aligned} &\sqrt{\frac{1^2}{0.111222}(0.111222 \times 1.111163 + 0.066987^2 \times 0.111222) - 1} = \sqrt{0.111222} \\ &\sqrt[0.5]{\frac{1^2}{0.111222}(0.111222 \times 1.111163 + 0.066987^2 \times 0.111222) - 1} = \sqrt{0.111222} \\ &\sqrt[0.0]{\frac{1^2}{0.111222}(0.111222 \times 1.111163 + 0.066987^2 \times 0.111222) - 1} = \sqrt{0.111222} \end{aligned}$$

The code for `\squish` was taken from <https://tex.stackexchange.com/questions/467942/how-to-squeeze-a-long-equation>.

6.11 Wide bar

ShorTeX provides the `\widebar` command to typeset a wide bar accent on top of a character (similar to the usual `\widehat` and `\widetilde` commands). Compare to the usual `\bar` and `\overline` commands:

widebar: \bar{A} overline: \overline{A} bar: \bar{A}

The code for `\widebar` was taken from <https://tex.stackexchange.com/questions/16337/can-i-get-a-widebar-without-using-the-mathabx-package>.

Note that the shortened style/accent code `b` in Section 3 encodes `\widebar`, not `\bar`.

7 Text mode macros

7.1 Common words and names with accents

| Syntax | Symbol |
|------------------------|----------|
| <code>\cadlag</code> | càdlàg |
| <code>\Frechet</code> | Fréchet |
| <code>\Gronwall</code> | Grönwall |
| <code>\Holder</code> | Hölder |
| <code>\Ito</code> | Itô |
| <code>\Levy</code> | Lévy |
| <code>\Matern</code> | Matérn |
| <code>\Nystrom</code> | Nyström |
| <code>\Renyi</code> | Rényi |
| <code>\Schatten</code> | Schatten |

7.2 Abbreviations with punctuation

| Name | Syntax | Symbol |
|--------|--------------------|--------|
| e.g., | <code>\eg</code> | e.g., |
| et al. | <code>\etal</code> | et al. |
| i.e., | <code>\ie</code> | i.e., |
| a.k.a. | <code>\aka</code> | a.k.a. |

8 Example Document

TODO!