

The mathdesign package

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1 Introduction

The package `mathdesign` replaces all the default mathematical fonts of \TeX with a complete set of mathematical fonts, designed to be combined with a text font of your choice.

Provided fonts cover the full family of symbol of plain \TeX and $\mathbb{E}\TeX$, the full set of the American Mathematical Society ($\mathcal{A}\mathcal{M}\mathcal{S}$) symbols, the Ralph Smith's Formal Script symbol fonts (RSFS). Some symbol used by the package `textcomp`. Some extra symbols are also defined.

More fonts will be created and shared in the future!

1.1 Requirements

A complete \TeX installation is required. In particular, the text fonts you want to use must be already present on your system.

A *recent* \TeX distribution is recommended (e.g. Mik \TeX v2.2 or later, $\text{t}\mathbb{E}\mathbb{X}$ v3.0 or later) as the configuration is really simple with the `updmap` utility.

2 Installation

This package alone is useless. You have to install one of the full set of fonts available. Please consult the provided README file. It deals with all the installation and system configuration process.

3 Interesting features

- All the symbols are provided in normal and bold versions.
- Support of all $\mathbb{E}\TeX$ and $\mathcal{A}\mathcal{M}\mathcal{S}$ symbols including blackboard bold letters (\mathbb{Q} , \mathbb{R} , \mathbb{Z}).
- Extra symbols, including `\euro` (€) `\smallin` (€) `\intclockwise` (\int) `\ointclockwise` (\oint) `\oiint` (\oiint) `\oiint` (\oiint).
- Support of scaled sans serif and typewriter fonts.

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4 Usage and configuration

To use one the font in your document call the `mathdesign` package with the appropriate option.

Text fonts	Option name	Package name
Adobe Utopia	<code>adobe-utopia</code> , <code>utopia</code>	<code>mdput</code>
URW Garamond	<code>urw-garamond</code> , <code>garamond</code>	<code>mdugm</code>
Bitstream Charter	<code>bitstream-charter</code> , <code>charter</code>	<code>mdbch</code>

Option on the same line of the preceding table are equivalent. The following lines are equivalent:

```
\usepackage[adobe-utopia]{mathdesign}
\usepackage[utopia]{mathdesign}
```

The package tries to redefine all the commands related to the glyphs present in the fonts. As far as I know, they work fine, but you shouldn't use package like `amsfonts` or `mathrsfs` in conjunction with `mathdesign`. A package warning will be emitted in such case.

Don't forget that many packages redefine the same command than `mathdesign` (the euro currency symbol is the worst example of this situation). You have to take care yourself of the possible package clashes.

The default encoding is automatically set to T1.

4.1 Options

Some `mathdesign` options use the `keyval` interface. As usual with `keyval`, any spaces between words are ignored and multiple lines are allowed. Moreover, options are order-independent.

For example, the following line asks for Bitstream Charter and upright capitals letters :

```
\usepackage[charter, uppercase=upright]{mathdesign}
```

The following options are available:

expert if the corresponding postscript font are available on your system, this option activates them. See section 4.2.1 for more informations.

euro activates the `mathdesign` version of the euro currency symbol (`\euro` (€)). This redefinition takes place `\AtBeginDocument`. Default value: `true`.

sfscaled= true or false Use a scaled version of common sans serif fonts (see explanations in section 4.3). Default value: `true`.

ttscaled= true or false Use a scaled version of common typewriter fonts (see explanations in section 4.3). Default value: `true`.

uppercase = upright or italicized In math mode, use `upright` or `italicized` uppercase letters. Default value: `italicized`.

greekuppercase= upright or italicized In math mode, use `upright` or `italicized` uppercase greek letters. Default value: `upright`.

greeklowercase= upright or italicized In math mode, use `upright` or `italicized` lowercase greek letters. Default value: `italicized`.

In french traditional typography, uppercase letters and lowercase greek letters are not italicised contrary to the english usage. For example

$$\forall t \in [0, 1], \quad (1 - t)A + tB \in [AB]$$

$$R = a^2 + b^2, \quad \theta = \arctan \frac{a}{b} \implies a \cos \alpha + b \sin \alpha = R \cos(\alpha + \theta)$$

are the “french” version of

$$\forall t \in [0, 1], \quad (1 - t)A + tB \in [AB]$$

$$R = a^2 + b^2, \quad \theta = \arctan \frac{a}{b} \implies a \cos \alpha + b \sin \alpha = R \cos(\alpha + \theta)$$

If you want to typeset a document in the old french traditions, use the following options:

```
\usepackage[uppercase=upright, greeklowercase=upright, garamond]{mathdesign}
```

Please, note that upright and slanted versions of the greek letters are always available, using commands `\alphaup`, `\alphait`, etc. (see tables 2 and 3).

4.2 Small capitals and oldstyle figures

4.2.1 Faked small capitals

It is not in the goals of the Math Design project to provide small capitals and typographic refinements of this sort. Anyway, “faked” small caps are defined by default¹. If you don’t load the package with the option `expert` then these small capitals will be used in your document.

4.2.2 Commercial small capitals

Alternatively you can buy the corresponding commercial fonts and use them with the `mathdesign` package.

To use commercial small capitals with the `charter` and `utopia` version of the fonts, you must:

1. Obtain the corresponding commercial fonts from your favorite font seller. This is the font you’ll need :

Bitstream Charter	Charter Small Cap	(bchrc8a.pfb)
	Charter Bold Small Cap	(bchbc8a.pfb)
Adobe Utopia	Utopia Expert Regular	(putr8x.pfb)
	Utopia Expert Bold	(putb8x.pfb)

You need the Windows Postscript versions of the fonts.

2. Rename the preceding font files. I have indicated in parenthesis the new name of each file.
3. Put the renamed file somewhere `TEX` will be able to find them: `$TEXMF/fonts/type1/bitsrea/charter` or `$TEXMF/fonts/type1/adobe/utopia` should be fine.
4. Refresh your `texmf` file database, by running an utility like `mktexlsr` or `texconfig rehash`.
5. THAT’S IT ! Now use the `mathdesign` package with the option `expert`. Small caps and oldstyle figure are available with the command `\textsc{...}`.

¹Two new nfss shape are defined and associated with these faked small capitals : `\fscshape` (variant `fsc`) for the upright faked small capitals and `\ficshape` (variante `fix`) for the slanted faked small caps

Nickname	Font
cmss	Computer Modern Sans Serif
fvs	Bera sans (aka Bitstream Vera Sans)
phv	Adobe Helvetica
fvm	Bera mono (aka Bitstream Vera Mono)
cmtt	Computer Modern Typewriter
pcr	Adobe Courier

Table 1: Scaled fonts defined.

Disclaimer The preceding informations are only *indications* of a possible way to install and use commercial products. I'm not responsible for any damage caused, in whole or in part, by following these instructions.

Anyway, I'll try to help you the best I can to properly install any commercial fonts you have.

4.3 Sans serif and typewriter fonts

In addition to the mathematical fonts, the `mathdesign` package defines “scaled” versions of the common sans serif and typewriter fonts.

For example, in \TeX , if you want to set Adobe Helvetica as your main sans serif font, you use the following command

```
\renewcommand{\sfdefault}{phv}
```

where `phv` is the name of Adobe Helvetica using Karl Berry's fontname convention.

But Adobe Helvetica will not fit well with your text font. Letters have different heights:

aabbAAeeDD

`mathdesign` defines a scaled version of this font. This version automatically replace the normal one. So, with the option `sfscaled`, the usual command

```
\renewcommand{\sfdefault}{phv}
```

will give you an optically adjusted version of Adobe Helvetica:

aabbAAccDD

As you can see on the above example, lowercase letters have now the same height. It is not necessary the case of uppercase letters.

Don't expect amazing result of these feature. If you mix sans serif and typewriter fonts in the text, then the design disparities will be become quickly obvious.

The table 4.3 enumerates all the scaled fonts defined by the `mathdesign` package.

4.4 Configuration file

Each family has its own configuration file (e.g. `mdput.cfg`). You can put in these file all the commands that \TeX should load with the family. Consult the provided files for more informations.

α	<code>\alphaup</code>	ι	<code>\iotaaup</code>	σ	<code>\sigmaup</code>
β	<code>\betaaup</code>	κ	<code>\kappaaup</code>	ς	<code>\varsigmaup</code>
γ	<code>\gammaaup</code>	λ	<code>\lambdaaup</code>	τ	<code>\tauaup</code>
δ	<code>\deltaaup</code>	μ	<code>\muup</code>	υ	<code>\upsilonup</code>
ϵ	<code>\epsilonup</code>	ν	<code>\nuup</code>	ϕ	<code>\phiup</code>
ε	<code>\varepsilonup</code>	ξ	<code>\xiup</code>	φ	<code>\varphiup</code>
ζ	<code>\zetaaup</code>	π	<code>\piup</code>	χ	<code>\chiup</code>
η	<code>\etaaup</code>	ϖ	<code>\varpiup</code>	ψ	<code>\psiup</code>
θ	<code>\thetaaup</code>	ρ	<code>\rhoaup</code>	ω	<code>\omegaup</code>
ϑ	<code>\varthetaaup</code>	ϱ	<code>\varrhoaup</code>		
κ	<code>\kappaup[†]</code>	\digamma	<code>\digammaup[†]</code>		
Γ	<code>\Gammaup</code>	Ξ	<code>\Xiup</code>	Φ	<code>\Phiup</code>
Δ	<code>\Deltaup</code>	Π	<code>\Piup</code>	Ψ	<code>\Psiup</code>
Θ	<code>\Thetaup</code>	Σ	<code>\Sigmaup</code>	Ω	<code>\Omegaup</code>
Λ	<code>\Lambdaup</code>	Υ	<code>\Upsilonup</code>		

Table 2: Upright Greek Letters

5 More fonts and symbols

5.1 Script and fraktur alphabets

The commands `\mathfrak`, `\mathscr` and `\mathbb` are defined by `mathdesign` and have the usual meanings:

- `\mathfrak` for fraktur letters *e.g.* `\mathfrak{A, B, S, a, b, s}` gives $\mathfrak{A}, \mathfrak{B}, \mathfrak{S}, \mathfrak{a}, \mathfrak{b}, \mathfrak{s}$
- `\mathscr` for script letters *e.g.* `\mathscr{A, B, S}` gives $\mathscr{A}, \mathscr{B}, \mathscr{S}$
- `\mathbb` for blackboard letters *e.g.* `\mathbb{A, B, S}` gives $\mathbb{A}, \mathbb{B}, \mathbb{S}$

5.2 Extra symbols

For completeness, some commands and symbols have been added:

- The command `\iddots` (`(\cdot\cdot\cdot)`) typesets diagonal dots, similar to \mathcal{AMS} 's `\ddots` (`(\cdot\cdot)`).
- Two new big delimiters are available, `\leftwave` ($\left\{ \right\}$) and `\leftevaw` ($\left\{ \right\}$) (and the corresponding right delimiters, of course). This is an example:

$$\left\{ \frac{a + b + c}{3} \right\}$$

- The commands `\utimes` (\times), `\dtimes` (\times) and `\udtimes` (\times) are similar to \mathcal{AMS} 's `\ltimes` (\times), `\rtimes` (\times) and `\Join` (\times).
- The `\in` (\in) symbol has now a small version `\smallin` (\in), which can be negated (`\notsmallin` (\notin)). `\owns` (\ni) has also a small version (`\smallowns` (\ni) and `\notsmallowns` (\noinv)).
- Various new integrals are defined : `\intclockwise` (\int) `\ointclockwise` (\oint) `\oint` (\oint) `\oiint` (\iint) `\oiiint` (\iiint).

α	<code>\alphait</code>	ι	<code>\iotait</code>	σ	<code>\sigmait</code>
β	<code>\betait</code>	κ	<code>\kappait</code>	ς	<code>\varsigmait</code>
γ	<code>\gammait</code>	λ	<code>\lambdait</code>	τ	<code>\tauit</code>
δ	<code>\deltait</code>	μ	<code>\muit</code>	υ	<code>\upsilonit</code>
ϵ	<code>\epsilonit</code>	ν	<code>\nuit</code>	ϕ	<code>\phiit</code>
ε	<code>\varepsilonit</code>	ξ	<code>\xiit</code>	φ	<code>\varphiit</code>
ζ	<code>\zetait</code>	π	<code>\piit</code>	χ	<code>\chiit</code>
η	<code>\etait</code>	ϖ	<code>\varpiit</code>	ψ	<code>\psiit</code>
θ	<code>\thetait</code>	ρ	<code>\rhoit</code>	ω	<code>\omegait</code>
ϑ	<code>\varthetait</code>	ϱ	<code>\varrhoit</code>		
κ	<code>\kappaait</code>	\digamma	<code>\digammit</code>		
Γ	<code>\Gammait</code>	Ξ	<code>\Xiit</code>	Φ	<code>\Phiit</code>
Δ	<code>\Deltait</code>	Π	<code>\Piit</code>	Ψ	<code>\Psiit</code>
Θ	<code>\Thetait</code>	Σ	<code>\Sigmit</code>	Ω	<code>\Omekait</code>
Λ	<code>\Lambdait</code>	Υ	<code>\Upsilonit</code>		

Table 3: Italicised Greek Letters

- The `\figurecircled` command is the equivalent of `\textcircled` circled command, but the circle is especially designed for figures : `\figurecircled{1}` gives $\textcircled{1}$ (better than `\textcircled{1}` : $\textcircled{1}$).

Some Text Companion symbols are also defined, including `\texteuro` ($\text{\textcircled{€}}$) (see table 42). To use them, you must load the `textcomp` package.

5.3 Copyright notice

The fonts provided by the Math Design project are free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License (appendix A of this document) for more details.

5.4 Acknowledgements

I have borrowed many codes, ideas, glyphs from various sources, and I would like to thanks all the authors of the original material, among others Alan Jeffrey and Jeremy Gibbons (`stmaryrd`), Yannis Haralambous (`yhmath` and the great greek fonts from Ω), Young Ryu (`txfonts/pxfonts`), Antony Phan (`mathabx`) and the \mathcal{AMS} .

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A Commands available

This is a remind of all the commands redefined in the mathdesign package².

\in	<code>\smallin</code>	\ni	<code>\smallowns</code>	\notin	<code>\notsmallin</code>	\nexists	<code>\notsmallowns</code>
\llcorner	<code>\rightangle</code>						

Table 4: Math Design extra symbols

\int	<code>\intclockwise</code>	\oint	<code>\ointclockwise</code>	\oint	<code>\ointctrlockwise</code>
\oiint	<code>\oiint</code>	\oiiint	<code>\oiiint</code>		

Table 5: Variable-sized Math Design Operators

\amalg	<code>\amalg</code>	\cup	<code>\cup</code>	\oplus	<code>\oplus</code>	\times	<code>\times</code>
\ast	<code>\ast</code>	\dagger	<code>\dagger</code>	\oslash	<code>\oslash</code>	\triangleleft	<code>\triangleleft</code>
\bigcirc	<code>\bigcirc</code>	\ddagger	<code>\ddagger</code>	\otimes	<code>\otimes</code>	\triangleright	<code>\triangleright</code>
\bigtriangledown	<code>\bigtriangledown</code>	\diamond	<code>\diamond</code>	\pm	<code>\pm</code>	\triangleleft^*	<code>\unlhd^*</code>
\bigtriangleup	<code>\bigtriangleup</code>	\div	<code>\div</code>	\triangleright	<code>\rhd^*</code>	\triangleright^*	<code>\unrhd^*</code>
\bullet	<code>\bullet</code>	\triangleleft	<code>\lhd^*</code>	\setminus	<code>\setminus</code>	\oplus	<code>\uplus</code>
\cap	<code>\cap</code>	\mp	<code>\mp</code>	\sqcap	<code>\sqcap</code>	\vee	<code>\vee</code>
\cdot	<code>\cdot</code>	\odot	<code>\odot</code>	\sqcup	<code>\sqcup</code>	\wedge	<code>\wedge</code>
\circ	<code>\circ</code>	\ominus	<code>\ominus</code>	\star	<code>\star</code>	\wr	<code>\wr</code>

* Not predefined in \TeX .

Table 6: Binary Operators

²The following table are strongly inspired from the excellent Scoot Pakin's *Comprehensive \TeX Symbol List* <http://www.ctan.org/tex-archive/help/Catalogue/entries/comprehensive.html>

\bigcap	<code>\bigcap</code>	\bigotimes	<code>\bigotimes</code>	\bigwedge	<code>\bigwedge</code>
\bigcup	<code>\bigcup</code>	\bigsqcup	<code>\bigsqcup</code>	\sum	<code>\sum</code>
\bigodot	<code>\bigodot</code>	\biguplus	<code>\biguplus</code>	\int	<code>\int</code>
\bigoplus	<code>\bigoplus</code>	\bigvee	<code>\bigvee</code>	\oint	<code>\oint</code>
\prod	<code>\prod</code>	\coprod	<code>\coprod</code>		

Table 7: Variable-sized Math Operators

\approx	<code>\approx</code>	\equiv	<code>\equiv</code>	\perp	<code>\perp</code>	\smile	<code>\smile</code>
\asymp	<code>\asymp</code>	\frown	<code>\frown</code>	\prec	<code>\prec</code>	\succ	<code>\succ</code>
\bowtie	<code>\bowtie</code>	\Join^*	<code>\Join^*</code>	\preceq	<code>\preceq</code>	\succeq	<code>\succeq</code>
\cong	<code>\cong</code>	\mid	<code>\mid</code>	\propto	<code>\propto</code>	\vdash	<code>\vdash</code>
\dashv	<code>\dashv</code>	\models	<code>\models</code>	\sim	<code>\sim</code>		
\doteq	<code>\doteq</code>	\parallel	<code>\parallel</code>	\simeq	<code>\simeq</code>		

* Not predefined in \TeX .

Table 8: Binary Relations

\sqsubset^*	<code>\sqsubset^*</code>	\sqsupseteq	<code>\sqsupseteq</code>	\supset	<code>\supset</code>
\sqsubseteq	<code>\sqsubseteq</code>	\subset	<code>\subset</code>	\supseteq	<code>\supseteq</code>
\sqsupset^*	<code>\sqsupset^*</code>	\subseteq	<code>\subseteq</code>		

* Not predefined in \TeX .

Table 9: Subset and Superset Relations

\geq	<code>\geq</code>	\gg	<code>\gg</code>	\leq	<code>\leq</code>	\ll	<code>\ll</code>	\neq	<code>\neq</code>
--------	-------------------	-------	------------------	--------	-------------------	-------	------------------	--------	-------------------

Table 10: Inequalities

\Downarrow	<code>\Downarrow</code>	\longleftarrow	<code>\longleftarrow</code>	\nwarrow	<code>\nwarrow</code>
\downarrow	<code>\downarrow</code>	\Longleftarrow	<code>\Longleftarrow</code>	\Rightarrow	<code>\Rightarrow</code>
\hookrightarrow	<code>\hookrightarrow</code>	\longleftrightarrow	<code>\longleftrightarrow</code>	\rightarrow	<code>\rightarrow</code>
\hookrightarrow	<code>\hookrightarrow</code>	\Longleftrightarrow	<code>\Longleftrightarrow</code>	\searrow	<code>\searrow</code>
\leadsto^*	<code>\leadsto^*</code>	\longmapsto	<code>\longmapsto</code>	\swarrow	<code>\swarrow</code>
\leftarrow	<code>\leftarrow</code>	\Longrightarrow	<code>\Longrightarrow</code>	\Uparrow	<code>\Uparrow</code>
\Leftarrow	<code>\Leftarrow</code>	\longrightarrow	<code>\longrightarrow</code>	\Uparrow	<code>\Uparrow</code>
\Leftrightarrow	<code>\Leftrightarrow</code>	\mapsto	<code>\mapsto</code>	\Updownarrow	<code>\Updownarrow</code>
$\leftrightharpoonrightarrow$	<code>\leftrightharpoonrightarrow</code>	\nearrow	<code>\nearrow</code>	\Updownarrow	<code>\Updownarrow</code>

* Not predefined in \TeX .

Table 11: Arrows

\leftarrow	<code>\leftharpoondown</code>	\rightarrow	<code>\rightharpoondown</code>
\longleftarrow	<code>\leftharpoonup</code>	\longrightarrow	<code>\rightharpoonup</code>
\Leftrightarrow	<code>\rightleftharpoons</code>		

Table 12: Harpoons

\perp	<code>\bot</code>	\forall	<code>\forall</code>	ι	<code>\imath</code>	\ni	<code>\ni</code>	\top	<code>\top</code>
ℓ	<code>\ell</code>	\hbar	<code>\hbar</code>	\in	<code>\in</code>	∂	<code>\partial</code>	\wp	<code>\wp</code>
\exists	<code>\exists</code>	\Im	<code>\Im</code>	j	<code>\jmath</code>	\Re	<code>\Re</code>		

Table 13: Letter-like Symbols

$\bar{-}$	<code>\relbar</code>	$\bar{=}$	<code>\Relbar</code>
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Table 14: Extension Characters

\downarrow	<code>\downarrow</code>	\Downarrow	<code>\Downarrow</code>	$[$	<code>[</code>	$]$	<code>]</code>
\langle	<code>\langle</code>	\rangle	<code>\rangle</code>	$ $	<code> </code>	$\ $	<code>\ </code>
\lceil	<code>\lceil</code>	\rceil	<code>\rceil</code>	\uparrow	<code>\uparrow</code>	\Uparrow	<code>\Uparrow</code>
\lfloor	<code>\lfloor</code>	\rfloor	<code>\rfloor</code>	\updownarrow	<code>\updownarrow</code>	\Updownarrow	<code>\Updownarrow</code>
$($	<code>(</code>	$)$	<code>)</code>	$\{$	<code>\{</code>	$\}$	<code>\}</code>
$/$	<code>/</code>	\backslash	<code>\backslash</code>				

Table 15: Variable-sized Delimiters

\int	<code>\lmoustache</code>	\int	<code>\rmoustache</code>	$\left(\left(\int\right)\right)$	<code>\lgroup</code>	\int	<code>\rgroup</code>
$ $	<code>\arrowvert</code>	$\ $	<code>\Arrowvert</code>	$ $	<code>\bracevert</code>		

Table 16: Large, Variable-sized Delimiters

\acute{a}	<code>\acute{a}</code>	\check{a}	<code>\check{a}</code>	\grave{a}	<code>\grave{a}</code>	\tilde{a}	<code>\tilde{a}</code>
\bar{a}	<code>\bar{a}</code>	\ddot{a}	<code>\ddot{a}</code>	\hat{a}	<code>\hat{a}</code>	\vec{a}	<code>\vec{a}</code>
\breve{a}	<code>\breve{a}</code>	\dot{a}	<code>\dot{a}</code>	\mathring{a}	<code>\mathring{a}</code>		

Table 17: Math-mode Accents

\widetilde{abc}	<code>\widetilde{abc}</code> *	\widehat{abc}	<code>\widehat{abc}</code> *
\overleftarrow{abc}	<code>\overleftarrow{abc}</code> †	\overrightarrow{abc}	<code>\overrightarrow{abc}</code> †
\overline{abc}	<code>\overline{abc}</code>	\underline{abc}	<code>\underline{abc}</code>
\overbrace{abc}	<code>\overbrace{abc}</code>	\underbrace{abc}	<code>\underbrace{abc}</code>
\sqrt{abc}	<code>\sqrt{abc}</code>		

Table 18: Extensible Accents

$\longleftrightarrow abcde$	<code>\overleftrightharrow{abcde}</code>	$\underleftrightharrow abcde$	<code>\underleftrightharrow{abcde}</code>
\overleftarrow{abcde}	<code>\overleftarrow{abcde}</code>	\overrightarrow{abcde}	<code>\overrightarrow{abcde}</code>
\xleftarrow{abcde}	<code>\xleftarrow{abcde}</code>	\xrightarrow{abcde}	<code>\xrightarrow{abcde}</code>

Table 19: \mathcal{AMS} Extensible Accents

\cdot	<code>\cdot</code>	$:$	<code>\colon</code>	\cdot	<code>\ldotp</code>	\vdots	<code>\vdots</code>
\cdots	<code>\cdots</code>	\ddots	<code>\ddots</code>	\dots	<code>\ldots</code>	\iddots	<code>\iddots</code> *

* Not predefined in $\mathbb{E}\mathbb{T}\mathbb{X}$.

Table 20: Dots

\aleph	<code>\aleph</code>	\diamond	<code>\Diamond</code> *	∞	<code>\infty</code>	$'$	<code>\prime</code>
\angle	<code>\angle</code>	\diamond	<code>\diamondsuit</code>	\mathcal{U}	<code>\mho</code> *	\sharp	<code>\sharp</code>
\backslash	<code>\backslash</code>	\emptyset	<code>\emptyset</code>	∇	<code>\nabla</code>	\spadesuit	<code>\spadesuit</code>
\square	<code>\Box</code> *	\flat	<code>\flat</code>	\natural	<code>\natural</code>	\surd	<code>\surd</code>
\clubsuit	<code>\clubsuit</code>	\heartsuit	<code>\heartsuit</code>	\neg	<code>\neg</code>	\triangle	<code>\triangle</code>

* Not predefined in $\mathbb{E}\mathbb{T}\mathbb{X}$.

Table 21: Miscellaneous $\mathbb{E}\mathbb{T}\mathbb{X}$ Symbols

$\$$	<code>\\$</code>	$_$	<code>_</code>	\ddagger	<code>\ddagger</code>	$\{$	<code>\{</code>
\pounds	<code>\pounds</code>	\copyright	<code>\copyright</code>	\dots	<code>\dots</code>	$\}$	<code>\}</code>
\S	<code>\S</code>	\dagger	<code>\dagger</code>	\pounds	<code>\pounds</code>		

Table 22: $\mathbb{E}\mathbb{T}\mathbb{X}$ Commands Defined to Work in Both Math and Text Mode

$\hat{\ } \$	<code>\textasciicircum</code>	$< \$	<code>\textless</code>
$\tilde{\ } \$	<code>\textasciitilde</code>	a	<code>\textordfeminine</code>
$\ast \$	<code>\textasteriskcentered</code>	o	<code>\textordmasculine</code>
$\backslash \$	<code>\textbackslashslash</code>	¶	<code>\textparagraph</code>
$\text{ } \$	<code>\textbar</code>	\cdot	<code>\textperiodcentered</code>
$\{ \$	<code>\textbraceleft</code>	?	<code>\textquestiondown</code>
$\} \$	<code>\textbraceright</code>	“	<code>\textquotedblleft</code>
$\bullet \$	<code>\textbullet</code>	”	<code>\textquotedblright</code>
©	<code>\textcopyright</code>	‘	<code>\textquoteleft</code>
†	<code>\textdagger</code>	’	<code>\textquoteright</code>
‡	<code>\textdaggerdbl</code>	®	<code>\textregistered</code>
$\text{\$}$	<code>\textdollar</code>	§	<code>\textsection</code>
\dots	<code>\textellipsis</code>	£	<code>\textsterling</code>
—	<code>\textendash</code>	™	<code>\texttrademark</code>
-	<code>\textendash</code>	-	<code>\textunderscore</code>
i	<code>\textexclamdown</code>	␣	<code>\textvisiblespace</code>
>	<code>\textgreater</code>		

Table 23: Predefined \TeX Text-mode Commands

Ä	ä	<code>\{A}\{a}</code>	À	à	<code>\{A}\{a}</code>	Å	å	<code>\k{A}\k{a}</code>
Á	á	<code>\' {A}\{a}</code>	Ā	ā	<code>\b{A}\b{a}</code>	Ă	ă	<code>\r{A}\r{a}</code>
Â	â	<code>\. {A}\{a}</code>	Ȧ	ȧ	<code>\c{A}\c{a}</code>	ĀĀ	āā	<code>\t{AA}\t{aa}</code>
Ă	ă	<code>\={A}\{a}</code>	Ȧ	ȧ	<code>\d{A}\d{a}</code>	Ǻ	ǻ	<code>\u{A}\u{a}</code>
Ȧ	ȧ	<code>\~ {A}\{a}</code>	Ǻ	ǻ	<code>\H{A}\H{a}</code>	ǻ	Ǽ	<code>\v{A}\v{a}</code>
Ǻ	ǻ	<code>\~ {A}\{a}</code>						

Ⓐ ⓐ `\textcircled{A}\textcircled{a}`

Table 24: Text-mode Accents

✓ `\checkmark` ® `\circledR` ✠ `\maltese`

Table 25: \AMS Commands Defined to Work in Both Math and Text Mode

$\bar{\wedge}$	<code>\barwedge</code>	⊙	<code>\circledcirc</code>	⋮	<code>\intercal</code>
\boxdot	<code>\boxdot</code>	⊖	<code>\circleddash</code>	⋈	<code>\Join</code>
\boxminus	<code>\boxminus</code>	⊃	<code>\Cup</code>	⋈	<code>\leftthreetimes</code>
\boxplus	<code>\boxplus</code>	⋈	<code>\curlyvee</code>	⋈	<code>\ltimes</code>
\boxtimes	<code>\boxtimes</code>	⋈	<code>\curlywedge</code>	⋈	<code>\rightthreetimes</code>
\Cap	<code>\Cap</code>	⋈	<code>\divideontimes</code>	⋈	<code>\rtimes</code>
\centerdot	<code>\centerdot</code>	⋈	<code>\dotplus</code>	⋈	<code>\smallsetminus</code>
⊗	<code>\circledast</code>	⋈	<code>\doublebarwedge</code>	⋈	<code>\veebar</code>

Table 26: \AMS Binary Operators

⋈ `\utimes` ⋈ `\dtimes` ⋈ `\udtimes`

Table 27: \AMS Extra Binary Operators (see section 5.2)

$\int \cdots \int \int \cdots \int$	<code>\idotsint</code>	$\iiint \iiiiiint$	<code>\iiint</code>
\iiiiiint	<code>\iiiiiint</code>	$\iint \iint$	<code>\iint</code>

Table 28: $\mathcal{A}\mathcal{M}\mathcal{S}$ Variable-sized Math Operators

\approx	<code>\approxeq</code>	\equiv	<code>\eqcirc</code>	\succapprox	<code>\succapprox</code>
ε	<code>\backepsilon</code>	$\ddot{=}$	<code>\fallingdotseq</code>	\succcurlyeq	<code>\succcurlyeq</code>
\backsimeq	<code>\backsimeq</code>	\multimap	<code>\multimap</code>	\succsim	<code>\succsim</code>
\backsimeq	<code>\backsimeq</code>	\pitchfork	<code>\pitchfork</code>	\therefore	<code>\therefore</code>
\because	<code>\because</code>	\precapprox	<code>\precapprox</code>	\thickapprox	<code>\thickapprox</code>
\between	<code>\between</code>	\preccurlyeq	<code>\preccurlyeq</code>	\thicksim	<code>\thicksim</code>
\Bumpeq	<code>\Bumpeq</code>	$\prec\sim$	<code>\prec\sim</code>	\varpropto	<code>\varpropto</code>
\bumpeq	<code>\bumpeq</code>	\risingdotseq	<code>\risingdotseq</code>	\Vdash	<code>\Vdash</code>
\circeq	<code>\circeq</code>	\shortmid	<code>\shortmid</code>	\vDash	<code>\vDash</code>
\curlyeqprec	<code>\curlyeqprec</code>	\shortparallel	<code>\shortparallel</code>	\Vvdash	<code>\Vvdash</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\smallfrown	<code>\smallfrown</code>		
\doteqdot	<code>\doteqdot</code>	\smallsmile	<code>\smallsmile</code>		

Table 29: $\mathcal{A}\mathcal{M}\mathcal{S}$ Binary Relations

\ncong	<code>\ncong</code>	\nshortparallel	<code>\nshortparallel</code>	\nVDash	<code>\nVDash</code>
\nmid	<code>\nmid</code>	\nsim	<code>\nsim</code>	\precnapprox	<code>\precnapprox</code>
\nparallel	<code>\nparallel</code>	\nsucc	<code>\nsucc</code>	\precnsim	<code>\precnsim</code>
\nprec	<code>\nprec</code>	\nsucceq	<code>\nsucceq</code>	\succnapprox	<code>\succnapprox</code>
\npreceq	<code>\npreceq</code>	\nVDash	<code>\nVDash</code>	\succnsim	<code>\succnsim</code>
\nshortmid	<code>\nshortmid</code>	\nvdash	<code>\nvdash</code>		

Table 30: $\mathcal{A}\mathcal{M}\mathcal{S}$ Negated Binary Relations

$\not\subseteq$	<code>\not\subseteq</code>	\subseteqq	<code>\subseteqq</code>	\supsetneqq	<code>\supsetneqq</code>
$\not\supseteq$	<code>\not\supseteq</code>	\subsetneq	<code>\subsetneq</code>	\varsubsetneq	<code>\varsubsetneq</code>
$\not\supseteqq$	<code>\not\supseteqq</code>	\subseteqqq	<code>\subseteqqq</code>	\varsubseteqqq	<code>\varsubseteqqq</code>
\sqsubset	<code>\sqsubset</code>	\Supset	<code>\Supset</code>	\varsupsetneq	<code>\varsupsetneq</code>
\sqsupset	<code>\sqsupset</code>	\supseteqq	<code>\supseteqq</code>	\varsupseteqqq	<code>\varsupseteqqq</code>
\Subset	<code>\Subset</code>	\supsetneq	<code>\supsetneq</code>		

Table 31: $\mathcal{A}\mathcal{M}\mathcal{S}$ Subset and Superset Relations

\succ	<code>\eqslantgtr</code>	\succ	<code>\gtrless</code>	\succ	<code>\lneq</code>
\succ	<code>\eqslantless</code>	\succ	<code>\gtrsim</code>	\succ	<code>\lneqq</code>
\equiv	<code>\geqq</code>	\equiv	<code>\gvertneqq</code>	\equiv	<code>\lnsim</code>
\succ	<code>\geqslant</code>	\equiv	<code>\leqq</code>	\equiv	<code>\lvertneqq</code>
\gg	<code>\ggg</code>	\succ	<code>\leqslant</code>	\succ	<code>\ngeq</code>
\approx	<code>\gnapprox</code>	\approx	<code>\lessapprox</code>	\approx	<code>\ngeqq</code>
\neq	<code>\gneq</code>	$\dot{\succ}$	<code>\lessdot</code>	\neq	<code>\ngeqslant</code>
\neqq	<code>\gneqq</code>	\sim	<code>\lesseqgtr</code>	\neq	<code>\ngtr</code>
\sim	<code>\gnsim</code>	\sim	<code>\lesseqqgtr</code>	\neq	<code>\nleq</code>
\approx	<code>\gtrapprox</code>	\sim	<code>\lessgtr</code>	\neq	<code>\nleqq</code>
$\dot{\succ}$	<code>\gtrdot</code>	\sim	<code>\lesssim</code>	\neq	<code>\nleqslant</code>
$\dot{\succ}$	<code>\gtreqless</code>	\lll	<code>\lll</code>	\neq	<code>\nless</code>
$\dot{\succ}$	<code>\gtreqqless</code>	\approx	<code>\lnapprox</code>		

Table 32: \mathcal{AMS} Inequalities

\blacktriangleleft	<code>\blacktriangleleft</code>	\blacktriangleright	<code>\blacktriangleright</code>	\triangleright	<code>\trianglerightrighteq</code>
\blacktriangleright	<code>\blacktriangleright</code>	\triangleleft	<code>\triangleleft</code>	\triangleleft	<code>\vartriangleleft</code>
\triangleleft	<code>\triangleleft</code>	\triangleleft	<code>\triangleleft</code>	\triangleright	<code>\vartriangleright</code>
\trianglelefteq	<code>\trianglelefteq</code>	\trianglelefteq	<code>\trianglelefteq</code>		

Table 33: \mathcal{AMS} Triangle Relations

\circleftarrow	<code>\circleftarrow</code>	\leftleftarrows	<code>\leftleftarrows</code>	\rightleftarrows	<code>\rightleftarrows</code>
\circrightarrow	<code>\circrightarrow</code>	\leftrightarrows	<code>\leftrightarrows</code>	\rightrightarrows	<code>\rightrightarrows</code>
\curvearrowleft	<code>\curvearrowleft</code>	\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\rightsquigarrow	<code>\rightsquigarrow</code>
\curvearrowright	<code>\curvearrowright</code>	\Lleftarrow	<code>\Lleftarrow</code>	\Rsh	<code>\Rsh</code>
\dashleftarrow	<code>\dashleftarrow</code>	\looparrowleft	<code>\looparrowleft</code>	\twoheadleftarrow	<code>\twoheadleftarrow</code>
\dashrightarrow	<code>\dashrightarrow</code>	\looparrowright	<code>\looparrowright</code>	\twoheadrightarrow	<code>\twoheadrightarrow</code>
\downdownarrows	<code>\downdownarrows</code>	\Lsh	<code>\Lsh</code>	\upuparrows	<code>\upuparrows</code>
\leftarrowtail	<code>\leftarrowtail</code>	\rightarrowtail	<code>\rightarrowtail</code>		

Table 34: \mathcal{AMS} Arrows

\nleftarrow	<code>\nleftarrow</code>	\nleftrightarrow	<code>\nleftrightarrow</code>	\nrightarrow	<code>\nrightarrow</code>
\leftarrow	<code>\leftarrow</code>	\leftrightarrow	<code>\leftrightarrow</code>	\rightarrow	<code>\rightarrow</code>

Table 35: \mathcal{AMS} Negated Arrows

\downharpoonleft	<code>\downharpoonleft</code>	\leftrightharpoons	<code>\leftrightharpoons</code>	\upharpoonleft	<code>\upharpoonleft</code>
\downharpoonright	<code>\downharpoonright</code>	\rightleftharpoons	<code>\rightleftharpoons</code>	\upharpoonright	<code>\upharpoonright</code>

Table 36: \mathcal{AMS} Harpoons

\beth	<code>\beth</code>	\gimel	<code>\gimel</code>	\daleth	<code>\daleth</code>
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Table 37: \mathcal{AMS} Hebrew Letters

\mathbb{k}	<code>\Bbbk</code>	\mathbb{C}	<code>\complement</code>	\hbar	<code>\hbar</code>
\textcircled{R}	<code>\circledR</code>	\Finv	<code>\Finv</code>	\hbar	<code>\hslash</code>
\textcircled{S}	<code>\circledS</code>	\Game	<code>\Game</code>	\nexists	<code>\nexists</code>

Table 38: $\mathcal{A}\mathcal{M}\mathcal{S}$ Letter-like Symbols

\ulcorner	<code>\ulcorner</code>	\urcorner	<code>\urcorner</code>
\llcorner	<code>\llcorner</code>	\lrcorner	<code>\lrcorner</code>

Table 39: $\mathcal{A}\mathcal{M}\mathcal{S}$ Delimiters

\ddot{a}	<code>\ddot{a}</code>	\ddot{a}	<code>\dddot{a}</code>
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Table 40: $\mathcal{A}\mathcal{M}\mathcal{S}$ Math-mode Accents

\sphericalangle	<code>\angle</code>	\blacktriangledown	<code>\blacktriangledown</code>	\mho	<code>\mho</code>
\backprime	<code>\backprime</code>	\diagdown	<code>\diagdown</code>	\sphericalangle	<code>\sphericalangle</code>
\bigstar	<code>\bigstar</code>	\diagup	<code>\diagup</code>	\square	<code>\square</code>
\blacklozenge	<code>\blacklozenge</code>	\eth	<code>\eth</code>	\triangledown	<code>\triangledown</code>
\blacksquare	<code>\blacksquare</code>	\lozenge	<code>\lozenge</code>	\varnothing	<code>\varnothing</code>
\blacktriangle	<code>\blacktriangle</code>	\measuredangle	<code>\measuredangle</code>	\vartriangle	<code>\vartriangle</code>

Table 41: Miscellaneous $\mathcal{A}\mathcal{M}\mathcal{S}$ Symbols

	<code>\textbardbl</code>		<code>\textbigcircle</code>
	<code>\textborn</code>		<code>\textbrokenbar</code>
•	<code>\textbullet</code>		<code>\textcelsius</code>
¢	<code>\textcent</code>		<code>\textcentoldstyle</code>
©	<code>\textcopyright</code>	†	<code>\textdagger</code>
‡	<code>\textdaggerdbl</code>	°	<code>\textdegree</code>
†	<code>\textdied</code>	∅	<code>\textdivorced</code>
\$	<code>\textdollar</code>		<code>\textdollaroldstyle</code>
↓	<code>\textdownarrow</code>	8	<code>\texteightoldstyle</code>
	<code>\textestimated</code>	5	<code>\textfiveoldstyle</code>
4	<code>\textfouroldstyle</code>		<code>\textguarani</code>
	<code>\textlbrackdbl</code>	←	<code>\textleftarrow</code>
	<code>\textlira</code>	∞	<code>\textmarried</code>
μ	<code>\textmu</code>	9	<code>\textnineoldstyle</code>
	<code>\textnumero</code>	Ω	<code>\textohm</code>
½	<code>\textonehalf</code>	1	<code>\textoneoldstyle</code>
¼	<code>\textonequarter</code>	◦	<code>\textopenbullet</code>
a	<code>\textordfeminine</code>	◦	<code>\textordmasculine</code>
‰	<code>\textpertenthousand</code>	‰	<code>\textperthousand</code>
±	<code>\textpm</code>		<code>\texttrbrackdbl</code>
®	<code>\textregistered</code>	→	<code>\textrightarrow</code>
§	<code>\textsection</code>	7	<code>\textsevenoldstyle</code>
6	<code>\textsixoldstyle</code>	£	<code>\textsterling</code>
√	<code>\textsurd</code>	3	<code>\textthreeoldstyle</code>
¾	<code>\textthreequarters</code>	™	<code>\texttrademark</code>
2	<code>\texttwooldstyle</code>	↑	<code>\textuparrow</code>
↑	<code>\textuparrow</code>	0	<code>\textzerooldstyle</code>
€	<code>\texteuro</code>		

Table 42: Text Companion symbols (Not predefined in \LaTeX . Use the package `textcomp`)

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