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 LATEX, the full set of the American Mathematical Society ($\mathcal{AMS}$) 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. MikTEX v2.2 or later, teTEX 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 LATEXand $\mathcal{AMS}$symbols including blackboard bold letters ($\mathbb{Q}$, $\mathbb{R}$, $\mathbb{Z}$).
- Extra symbols, including `\euro` (€)`\smallin` ($\in$)`\intclockwise` ($\int\!\!\!\!\!\!\circlearrowright$)`\ointclockwise` ($\oint\!\!\!\!\!\!\circlearrowright$)`\oiint` ($\oiint$)`\oiiint` ($\oiiint$).
- Various greek alphabets available.
- 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	adobe-utopia, utopia	mdput
URW Garamond	urw-garamond, garamond	mdugm
Bitstream Charter	bitstream-charter, charter	mdbch

In the preceding table, option on the same line are equivalent. Then, 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 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:

greekfamily = <value> three greek fonts are available : the default mathdesign font, `didot` which came from GFS Didot, and `bodoni` taken from GFS Bodoni. These two fonts are released by the Greek Font Society[1].

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`.

scaled= <value> true Scale all the mathdesign fonts (including math and small caps when available). Default value: `1.0`.

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`.

[1] `http://greekfontsociety.gr/`

lowercase = upright *or* italicized In math mode, use `upright` or `italicized` lowercase 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

$$\forall t \in [0,1], \qquad (1-t)\mathrm{A} + t\,\mathrm{B} \in [\mathrm{AB}]$$

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

are the "french" version of

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

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

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 default[2]. 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.

[2] Two 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.

3. Put the renamed file somewhere TEXwill 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{...}`.

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 LATEX, 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.

α	\alphaup	ι	\iotaup	σ	\sigmaup
β	\betaup	κ	\kappaup	ς	\varsigmaup
γ	\gammaup	λ	\lambdaup	τ	\tauup
δ	\deltaup	μ	\muup	υ	\upsilonup
ϵ	\epsilonup	ν	\nuup	ϕ	\phiup
ε	\varepsilonup	ξ	\xiup	φ	\varphiup
ζ	\zetaup	π	\piup	χ	\chiup
η	\etaup	ϖ	\varpiup	ψ	\psiup
θ	\thetaup	ρ	\rhoup	ω	\omegaup
ϑ	\varthetaup	ϱ	\varrhoup		
$\varkappa$	\varkappaup[†]	$\digamma$	\digammaup[†]		
Γ	\Gammaup	Ξ	\Xiup	Φ	\Phiup
Δ	\Deltaup	Π	\Piup	Ψ	\Psiup
Θ	\Thetaup	Σ	\Sigmaup	Ω	\Omegaup
Λ	\Lambdaup	Υ	\Upsilonup		

Table 2: Upright Greek Letters

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 LaTeX should load with the family. Consult the provided files for more informations.

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

$$\leftwave \frac{a+b+c}{3} \leftevaw$$

- The commands `\utimes` ($\utimes$), `\dtimes` ($\dtimes$) and `\udtimes` ($\udtimes$) are similar to $\mathcal{AMS}$'s `\ltimes` ($\ltimes$), `\rtimes` ($\rtimes$) and `\Join` ($\Join$).

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

Table 3: Italicised Greek Letters

- The `\in` ($\in$) symbol has now a small version `\smallin` ($\smallin$), which can be negated (`\notsmallin` ($\notsmallin$)). `\owns` ($\owns$) has also a small version (`\smallowns` ($\smallowns$) and `\notsmallowns` ($\notsmallowns$)).
- Various new integrals are defined : `\intclockwise` ($\intclockwise$)`\ointclockwise` ($\ointclockwise$)`\oiint` ($\oiint$)`\oiiint` ($\oiiint$).
- The `\figurecircled` command is the equivalent of `\textcircled` circled command, but the circle is especially designed for figures : `\figurecircled{1}` gives 1 (better than `\textcircled{1}` : ⓵).

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

5.3 Copyright notice

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 $\mathcal{AMS}$.

I would like to thank in particular Céline Chevalier, Sébastien Desvreux and Walter Appel for their kind support and friendly help.

Contents

A Commands available

This is a remind of all the commands redefined in the mathdesign package[3].

∈	`\smallin`	∋	`\smallowns`	∉	`\notsmallin`	∌	`\notsmallowns`
⌞	`\rightangle`						

Table 4: Math Design extra symbols

∱	`\intclockwise`	∲	`\ointclockwise`	∳	`\ointctrclockwise`
∯	`\oiint`	∰	`\oiiint`		

Table 5: Variable-sized Math Design Operators

[3]The following table are strongly inspired from the excellent Scoot Pakin's *Comprehensive LaTeX Symbol List* `http://www.ctan.org/tex-archive/help/Catalogue/entries/comprehensive.html`

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

* Not predefined in LaTeX.

Table 6: Binary Operators

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

Table 7: Variable-sized Math Operators

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

* Not predefined in LaTeX.

Table 8: Binary Relations

$\sqsubset$	\sqsubset*	$\sqsupseteq$	\sqsupseteq	$\supset$	\supset
$\sqsubseteq$	\sqsubseteq	$\subset$	\subset	$\supseteq$	\supseteq
$\sqsupset$	\sqsupset*	$\subseteq$	\subseteq		

* Not predefined in LaTeX.

Table 9: Subset and Superset Relations

$\geq$	\geq	$\gg$	\gg	$\leq$	\leq	$\ll$	\ll	$\neq$	\neq

Table 10: Inequalities

⇓	\Downarrow	⟵	\longleftarrow	↖	\nwarrow
↓	\downarrow	⟸	\Longleftarrow	⇒	\Rightarrow
↩	\hookleftarrow	⟷	\longleftrightarrow	→	\rightarrow
↪	\hookrightarrow	⟺	\Longleftrightarrow	↘	\searrow
⇝	\leadsto*	⟼	\longmapsto	↙	\swarrow
←	\leftarrow	⟹	\Longrightarrow	↑	\uparrow
⇐	\Leftarrow	⟶	\longrightarrow	⇑	\Uparrow
⇔	\Leftrightarrow	↦	\mapsto	↕	\updownarrow
↔	\leftrightarrow	↗	\nearrow	⇕	\Updownarrow

* Not predefined in LaTeX.

Table 11: Arrows

↽	\leftharpoondown	⇁	\rightharpoondown
↼	\leftharpoonup	⇀	\rightharpoonup
⇌	\rightleftharpoons		

Table 12: Harpoons

⊥	\bot	∀	\forall	ı	\imath	∋	\ni	⊤	\top
ℓ	\ell	ℏ	\hbar	∈	\in	∂	\partial	℘	\wp
∃	\exists	ℑ	\Im	ȷ	\jmath	ℜ	\Re		

Table 13: Letter-like Symbols

–	\relbar	=	\Relbar

Table 14: Extension Characters

↓	⏐	\downarrow	⇓	‖	\Downarrow	[	⎡	[	]	⎤	]
⟨	⟨	\langle	⟩	⟩	\rangle	|	⏐	|	‖	‖	\\|
⌈	⎡	\lceil	⌉	⎤	\rceil	↑	⏐	\uparrow	⇑	‖	\Uparrow
⌊	⎣	\lfloor	⌋	⎦	\rfloor	↕	⏐	\updownarrow	⇕	‖	\Updownarrow
(	⎛	(	)	⎞	)	{	⎧	\{	}	⎫	\}
/	⧸	/	\	⧹	\backslash						

Table 15: Variable-sized Delimiters

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

Table 16: Large, Variable-sized Delimiters

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

Table 17: Math-mode Accents

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

Table 18: Extensible Accents

$\overleftrightarrow{abcde}$	\overleftrightarrow{abcde}	$\underleftrightarrow{abcde}$	\underleftrightarrow{abcde}
$\underleftarrow{abcde}$	\underleftarrow{abcde}	$\underrightarrow{abcde}$	\underrightarrow{abcde}
$\xleftarrow{abcde}$	\xleftarrow{abcde}	$\xrightarrow{abcde}$	\xrightarrow{abcde}

Table 19: $\mathcal{AMS}$ Extensible Accents

$\cdotp$	\cdotp	:	\colon	.	\ldotp	$\vdots$	\vdots
$\cdots$	\cdots	$\ddots$	\ddots	...	\ldots	$\iddots$	\iddots*

* Not predefined in LaTeX.

Table 20: Dots

ℵ	\aleph	◊	\Diamond*	∞	\infty	′	\prime
∠	\angle	♢	\diamondsuit	℧	\mho*	♯	\sharp
\	\backslash	∅	\emptyset	∇	\nabla	♠	\spadesuit
□	\Box*	♭	\flat	♮	\natural	√	\surd
♣	\clubsuit	♡	\heartsuit	¬	\neg	△	\triangle

* Not predefined in LaTeX.

Table 21: Miscellaneous LaTeX Symbols

$	\$	_	_	‡	\ddag	{	\{
¶	\P	©	\copyright	…	\dots	}	\}
§	\S	†	\dag	£	\pounds		

Table 22: LaTeX Commands Defined to Work in Both Math and Text Mode

^	\textasciicircum	<	\textless
~	\textasciitilde	ª	\textordfeminine
	\textasteriskcentered	º	\textordmasculine
\	\textbackslash	¶	\textparagraph
|	\textbar	·	\textperiodcentered
{	\textbraceleft	¿	\textquestiondown
}	\textbraceright	“	\textquotedblleft
•	\textbullet	”	\textquotedblright
©	\textcopyright	‘	\textquoteleft
†	\textdagger	’	\textquoteright
‡	\textdaggerdbl	®	\textregistered
$	\textdollar	§	\textsection
…	\textellipsis	£	\textsterling
—	\textemdash	™	\texttrademark
–	\textendash	_	\textunderscore
¡	\textexclamdown	␣	\textvisiblespace
>	\textgreater		

Table 23: Predefined LaTeX Text-mode Commands

Ä	ä	\"{A}\"{a}	À	à	\‘{A}\‘{a}	Ą	ą	\k{A}\k{a}
Á	á	\’{A}\’{a}	A̲	a̲	\b{A}\b{a}	Å	å	\r{A}\r{a}
Ȧ	ȧ	\.{A}\.{a}	Ą̇	ą̇	\c{A}\c{a}	A͡A	a͡a	\t{AA}\t{aa}
Ā	ā	\={A}\={a}	Ạ	ạ	\d{A}\d{a}	Ă	ă	\u{A}\u{a}
Â	â	\^{A}\^{a}	A̋	a̋	\H{A}\H{a}	Ǎ	ǎ	\v{A}\v{a}
Ã	ã	\~{A}\~{a}						

Ⓐ ⓐ \textcircled{A}\textcircled{a}

Table 24: Text-mode Accents

✓ \checkmark ® \circledR ✠ \maltese

Table 25: $\mathcal{AMS}$ Commands Defined to Work in Both Math and Text Mode

⊼	\barwedge	⊚	\circledcirc	⋏	\intercal
⊡	\boxdot	⊝	\circleddash	⋈	\Join
⊟	\boxminus	⋓	\Cup	⋋	\leftthreetimes
⊞	\boxplus	⋎	\curlyvee	⋉	\ltimes
⊠	\boxtimes	⋏	\curlywedge	⋌	\rightthreetimes
⋒	\Cap	⋇	\divideontimes	⋊	\rtimes
▪	\centerdot	∔	\dotplus	⧹	\smallsetminus
⊛	\circledast	⩚	\doublebarwedge	⩒	\veebar

Table 26: $\mathcal{AMS}$ Binary Operators

⨴	\utimes	⨵	\dtimes	⨶	\udtimes

Table 27: $\mathcal{AMS}$ Extra Binary Operators (see section 5.2)

$\int\cdots\int\int\cdots\int$	\idotsint	$\iiint\iiint$	\iiint
$\iiiint\iiiint$	\iiiint	$\iint\iint$	\iint

Table 28: $\mathcal{AMS}$ Variable-sized Math Operators

≊	\approxeq	≖	\eqcirc	⪸	\succapprox
϶	\backepsilon	≒	\fallingdotseq	≽	\succcurlyeq
∽	\backsim	⊸	\multimap	≿	\succsim
⋍	\backsimeq	⋔	\pitchfork	∴	\therefore
∵	\because	⪷	\precapprox	≈	\thickapprox
≬	\between	≼	\preccurlyeq	∼	\thicksim
≎	\Bumpeq	≾	\precsim	∝	\varpropto
≏	\bumpeq	≒	\risingdotseq	⊩	\Vdash
≑	\circeq	∣	\shortmid	⊨	\vDash
≺	\curlyeqprec	∥	\shortparallel	⊪	\Vvdash
≻	\curlyeqsucc	⌒	\smallfrown		
≒	\doteqdot	⌣	\smallsmile		

Table 29: $\mathcal{AMS}$ Binary Relations

≇	\ncong	∦	\nshortparallel	⊯	\nVDash
∤	\nmid	≁	\nsim	⪹	\precnapprox
∦	\nparallel	⊁	\nsucc	⋨	\precnsim
⊀	\nprec	⋡	\nsucceq	⪺	\succnapprox
⋠	\npreceq	⊭	\nvDash	⋩	\succnsim
∦	\nshortmid	⊬	\nvdash		

Table 30: $\mathcal{AMS}$ Negated Binary Relations

$\nsubseteq$	\nsubseteq	$\subseteqq$	\subseteqq	$\supsetneqq$	\supsetneqq
$\nsupseteq$	\nsupseteq	$\subsetneq$	\subsetneq	$\varsubsetneq$	\varsubsetneq
$\nsupseteqq$	\nsupseteqq	$\subsetneqq$	\subsetneqq	$\varsubsetneqq$	\varsubsetneqq
$\sqsubset$	\sqsubset	$\Supset$	\Supset	$\varsupsetneq$	\varsupsetneq
$\sqsupset$	\sqsupset	$\supseteqq$	\supseteqq	$\varsupsetneqq$	\varsupsetneqq
$\Subset$	\Subset	$\supsetneq$	\supsetneq		

Table 31: $\mathcal{AMS}$ Subset and Superset Relations

$\eqslantgtr$	\eqslantgtr	$\gtrless$	\gtrless	$\lneq$	\lneq
$\eqslantless$	\eqslantless	$\gtrsim$	\gtrsim	$\lneqq$	\lneqq
$\geqq$	\geqq	$\gvertneqq$	\gvertneqq	$\lnsim$	\lnsim
$\geqslant$	\geqslant	$\leqq$	\leqq	$\lvertneqq$	\lvertneqq
$\ggg$	\ggg	$\leqslant$	\leqslant	$\ngeq$	\ngeq
$\gnapprox$	\gnapprox	$\lessapprox$	\lessapprox	$\ngeqq$	\ngeqq
$\gneq$	\gneq	$\lessdot$	\lessdot	$\ngeqslant$	\ngeqslant
$\gneqq$	\gneqq	$\lesseqgtr$	\lesseqgtr	$\ngtr$	\ngtr
$\gnsim$	\gnsim	$\lesseqqgtr$	\lesseqqgtr	$\nleq$	\nleq
$\gtrapprox$	\gtrapprox	$\lessgtr$	\lessgtr	$\nleqq$	\nleqq
$\gtrdot$	\gtrdot	$\lesssim$	\lesssim	$\nleqslant$	\nleqslant
$\gtreqless$	\gtreqless	$\lll$	\lll	$\nless$	\nless
$\gtreqqless$	\gtreqqless	$\lnapprox$	\lnapprox		

Table 32: $\mathcal{AMS}$ Inequalities

$\blacktriangleleft$	\blacktriangleleft	$\ntriangleright$	\ntriangleright	$\trianglerighteq$	\trianglerighteq
$\blacktriangleright$	\blacktriangleright	$\ntrianglerighteq$	\ntrianglerighteq	$\vartriangleleft$	\vartriangleleft
$\ntriangleleft$	\ntriangleleft	$\ntrianglelefteq$	\ntrianglelefteq	$\vartriangleright$	\vartriangleright
$\trianglelefteq$	\trianglelefteq	$\triangleq$	\triangleq		

Table 33: $\mathcal{AMS}$ Triangle Relations

$\circlearrowleft$	\circlearrowleft	$\leftleftarrows$	\leftleftarrows	$\rightleftarrows$	\rightleftarrows
$\circlearrowright$	\circlearrowright	$\leftrightarrows$	\leftrightarrows	$\rightrightarrows$	\rightrightarrows
$\curvearrowleft$	\curvearrowleft	$\leftrightsquigarrow$	\leftrightsquigarrow	$\rightsquigarrow$	\rightsquigarrow
$\curvearrowright$	\curvearrowright	$\Lleftarrow$	\Lleftarrow	$\Rsh$	\Rsh
$\dashleftarrow$	\dashleftarrow	$\looparrowleft$	\looparrowleft	$\twoheadleftarrow$	\twoheadleftarrow
$\dashrightarrow$	\dashrightarrow	$\looparrowright$	\looparrowright	$\twoheadrightarrow$	\twoheadrightarrow
$\downdownarrows$	\downdownarrows	$\Lsh$	\Lsh	$\upuparrows$	\upuparrows
$\leftarrowtail$	\leftarrowtail	$\rightarrowtail$	\rightarrowtail		

Table 34: $\mathcal{AMS}$ Arrows

$\nLeftarrow$	\nLeftarrow	$\nLeftrightarrow$	\nLeftrightarrow	$\nRightarrow$	\nRightarrow
$\nleftarrow$	\nleftarrow	$\nleftrightarrow$	\nleftrightarrow	$\nrightarrow$	\nrightarrow

Table 35: $\mathcal{AMS}$ Negated Arrows

⇃	\downharpoonleft	⇋	\leftrightharpoons	↿	\upharpoonleft
⇂	\downharpoonright	⇌	\rightleftharpoons	↾	\upharpoonright

Table 36: $\mathcal{AMS}$ Harpoons

ב	\beth	ג	\gimel	ד	\daleth

Table 37: $\mathcal{AMS}$ Hebrew Letters

𝕜	\Bbbk	∁	\complement	ℏ	\hbar
®	\circledR	ⅎ	\Finv	ℏ	\hslash
Ⓢ	\circledS	⅁	\Game	∄	\nexists

Table 38: $\mathcal{AMS}$ Letter-like Symbols

⌜	\ulcorner	⌝	\urcorner
⌞	\llcorner	⌟	\lrcorner

Table 39: $\mathcal{AMS}$ Delimiters

$\ddot{a}$	\dddot{a}	$\dddot{a}$	\ddddot{a}

Table 40: $\mathcal{AMS}$ Math-mode Accents

∠	\angle	▼	\blacktriangledown	℧	\mho
‵	\backprime	╲	\diagdown	⪡	\sphericalangle
★	\bigstar	╱	\diagup	□	\square
⧫	\blacklozenge	ð	\eth	▽	\triangledown
■	\blacksquare	◊	\lozenge	∅	\varnothing
▲	\blacktriangle	∡	\measuredangle	△	\vartriangle

Table 41: Miscellaneous $\mathcal{AMS}$ Symbols

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

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

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