IATEX Mathematical Symbols

The more unusual symbols are not defined in base LATEX (NFSS) and require \usepackage{amssymb}

1 Greek and Hebrew letters

α	\alpha	κ	\kappa	ψ	\psi	F	\digamma	Δ	\Delta	Θ	\Theta
β	\beta	λ	\lambda	ρ	\rho	ε	\varepsilon	Γ	\Gamma	Υ	\Upsilon
χ	\chi	μ	\mu	σ	\sigma	\varkappa	\varkappa	Λ	\Lambda	Ξ	\Xi
δ	\delta	ν	\nu	au	\tau	φ	\varphi	Ω	\Omega		
ϵ	\epsilon	o	0	θ	\theta	ϖ	\varpi	Φ	\Phi	×	\aleph
η	\eta	ω	\omega	v	\upsilon	ϱ	\varrho	Π	\Pi	コ	\beth
γ	\gamma	ϕ	\phi	ξ	\xi	ς	\varsigma	Ψ	\Psi	٦	\daleth
ι	\iota	π	\pi	Ċ	\zeta	ϑ	\vartheta	\sum	\Sigma	ב	\gimel

2 LATEX math constructs

```
\frac{abc}{xyz}
                                                   \operatorname{\mathtt{Noverline}}\{\operatorname{abc}\}
                                                                                        \overrightarrow{abc}
                                                                                                 \overrightarrow{abc}
                                             \overline{abc}
 f'
          f,
                                                   \underline{abc}
                                                                                        abc
                                                                                                 \overleftarrow{abc}
                                             \underline{abc}
\sqrt{abc}
                                                                                        \overbrace{abc}
          \sqrt{abc}
                                             \widehat{abc}
                                                    \widehat{abc}
                                                                                                 \overbrace{abc}
\sqrt[n]{abc}
          \sqrt[n]{abc}
                                             abc \widetilde{abc}
                                                                                                 \underbrace{abc}
                                                                                        abc_{j}
```

3 Delimiters

	{	\{	L	\lfloor	/	/	⇑	\Uparrow	L	\llcorner
\vert	}	\}		\rfloor	\	\backslash	\uparrow	\uparrow	٦	\lrcorner
\ I	<	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	Γ	\lceil	[[\Downarrow	\Downarrow	Г	\ulcorner
\Vert	\rangle	\rangle	1	\rceil]]	\downarrow	\downarrow	٦	\urcorner

4 Variable-sized symbols (displayed formulae show larger version)

\sum	\sum	ſ	$\$ int	+	\biguplus	\oplus	\bigoplus	V	\bigvee
Π	\prod	∮	\oint	\cap	\bigcap	\otimes	\bigotimes	\wedge	\bigwedge
П	\coprod	ĴĴ	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	U	\bigcup	\odot	\bigodot		\bigsqcup

5 Standard Function Names

arccos	\arccos	arcsın	\arcsin	arctan	\arctan	arg	\arg	
\cos	\cos	\cosh	\cosh	\cot	\cot	\coth	\coth	
\csc	\csc	\deg	\deg	\det	\det	\dim	\dim	
\exp	\exp	gcd	\gcd	hom	\hom	\inf	$\$ inf	
ker	\ker	lg	\lg	\lim	\lim	$\lim\inf$	\label{liminf}	
\limsup	\limsup	\ln	\ln	\log	\log	max	\max	
\min	\min	\Pr	\Pr	\sec	\sec	\sin	\sin	
\sinh	\sinh	\sup	\sup	an	\tan	anh	\tanh	

6 Binary Operation/Relation Symbols

*	\ast	\pm	\pm	\cap	\cap	\triangleleft	\lhd
*	\star	干	\mp	\cup	\cup	\triangleright	\rhd
	\cdot	П	\amalg	\forall	\uplus	◁	\triangleleft
0	\circ	\odot	\odot	П	\sqcap	\triangleright	\triangleright
•	\bullet	Θ	\ominus	Ш	\sqcup	⊴	\unlhd
\bigcirc	\bigcirc	\oplus	\oplus	\wedge	\wedge	\succeq	\unrhd
♦	\diamond	Ø	\oslash	\ \	\vee	∇	\bigtriangledown
×	\times	\otimes	\otimes	†	\dagger	$\stackrel{\vee}{\triangle}$	\bigtriangleup
÷	\div	₹	\wr	+	\ddagger	\	\setminus
	\centerdot		\Box	‡	\barwedge	<u>\</u>	\veebar
•	\circledast	⊞			_	Ϋ́	
*			\boxplus	人	\curlywedge	Y UJ	\curlyvee
	\circledcirc		\boxminus	\square	\Cap	T	\Cup
⊝	\circleddash		\boxtimes	\perp	\bot		\top
+	\dotplus		\boxdot	<u>T</u>	\intercal		\rightthreetimes
*	\divideontimes		\square	٨	\doublebarwedge	λ	\leftthreetimes
=	\equiv	\leq	\leq	\geq	\geq	\perp	\perp
\cong	\cong	\prec	\prec	\succ	\succ		\mid
\neq	\neq	\preceq	\preceq	\succeq	\succeq	İ	\parallel
\sim	\sim	~	\11	≫	\gg	\bowtie	\bowtie
\simeq	\simeq	\subset	\subset	\supset	\supset	M	\Join
\approx	\approx	\subseteq	\subseteq	\supseteq	\supseteq	×	\ltimes
\simeq	\asymp		\sqsubset	\exists	\sqsupset	×	\rtimes
Ė	\doteq		\sqsubseteq	\exists	\sqsupseteq		\smile
\propto	\propto	=	\dashv	= -	\vdash	$\overline{}$	\frown
<u>∝</u>	\models	\in	\in	∋	\ni	∉	\notin
	(modelb		(111		(III	7-	(110 0 111
\cong	\approxeq	\leq	\leqq	\geq	\geqq	\leq	\lessgtr
~	\thicksim	\leq	\leqslant	\geqslant	\geqslant	\leq	\lesseqgtr
\sim	\backsim	×≈	\lessapprox	\gtrapprox	\gtrapprox	W	\lesseqqgtr
\simeq	\backsimeq	~	\111	>>>	\ggg	\geq	\gtreqqless
\triangleq	\triangleq	<	\lessdot	>	\gtrdot	\geq	\gtreqless
<u>•</u>	\circeq	\lesssim	\lesssim	\gtrsim	\gtrsim	⋛	\gtrless
<u>~</u>	\bumpeq	~	\eqslantless		\eqslantgtr	→	\backepsilon
≎	\Bumpeq	W Y?Y?	\precsim	%Y	\succsim	Ŏ	\between
÷	\doteqdot	\sim	\precapprox	∠ _	\succapprox	х М	\pitchfork
· ≈	\thickapprox	≈	\Subset	≋	\Supset	1	\shortmid
Έ.	\fallingdotseq	\subseteq	\subseteqq		\supseteqq	\sim	\smallfrown
—. ≓	\risingdotseq	≡	\sqsubseteqq	\supseteq	\sqsupset		\smallsmile
\propto	\varpropto	≼	\preccurlyeq	≽	\succcurlyeq	I 	\Vdash
	\therefore	~ ⊀	\curlyeqprec	<i>⊱</i>	\curlyeqsucc	" =	\vDash
.·.	\therefore \because			-		∏⊢	\Vvdash
·:	\eqcirc	4	\blacktriangleleft \trianglelefteq	>	\blacktriangleright		
===	-	⊴	•	\trianglerighteq	\trianglerighteq	Ш	\shortparallel
\neq	\neq	\triangleleft	\vartriangleleft	\triangleright	\vartriangleright	Ħ	\nshortparallel
\ncong	\ncong	***	\nleq	≱	\ngeq	⊈	\nsubseteq
1	\nmid	≨	\nleqq	***	\ngeqq	⊉	\nsupseteq
#	\nparallel	≰	\nleqslant	≱	\ngeqslant	⊈	\nsubseteqq
 ∤	\nshortmid	<i>*</i>	\nless	*	\ngtr	∌	\nsupseteqq
Ħ	\nshortparallel		\nprec		\nsucc	Ç	\subsetneq
~	\nsim	<u>.</u>	\npreceq	<i>;</i> */	\nsucceq	Ş	\supsetneq
¥	\nVDash	\simeq	\precnapprox	5	\succnapprox	<u> </u>	\subsetneqq
⊭	\nvDash	~ ~	\precnsim	≻.	\succnsim	5	\supsetneqq
` 	\nvdash	% ≤:	\lnapprox	<i>∞</i> ≥:	\gnapprox	≠ C	\varsubsetneq
^ ≰1	\ntriangleleft	<i>≈</i> <	\lneq	<i>≈</i> >	\gneq	$\stackrel{\sim}{=}$	\varsupsetneq
× ≰	\ntrianglelefteq	<i></i>	\lneqq	>	\gneqq	Z.	\varsubsetneqq
≠	\ntriangleright	#^\$^\#^\$\@\\$\#\\$\	\lnsim	#V&V#V*V*V*X#Y#X	\gnsim		\varsupsetneqq
₽ ₽	\ntrianglerighteq	× ×	\linsim \lvertneqq	<i></i> ∻	\gvertneqq	≠	/ var pahpe onedd
7	'mor rame for remodd	#	12101011044	#	'P 101 011044		

7 Arrow symbols

	v				
\leftarrow	\leftarrow	←	\longleftarrow	↑	\uparrow
\Leftarrow	\Leftarrow	\iff	\Longleftarrow	\uparrow	\Uparrow
\rightarrow	\rightarrow	\longrightarrow	\longrightarrow	\downarrow	\downarrow
\Rightarrow	\Rightarrow	\Longrightarrow	\Longrightarrow	\Downarrow	\Downarrow
\longleftrightarrow	\leftrightarrow	\longleftrightarrow	\longleftrightarrow	1	\updownarrow
\Leftrightarrow	\Leftrightarrow	\iff	\Longleftrightarrow	1	\Updownarrow
\mapsto	\mapsto	\longmapsto	\longmapsto	7	\nearrow
\leftarrow	\hookleftarrow	\hookrightarrow	\hookrightarrow	\	\searrow
_	\leftharpoonup		\rightharpoonup	/	\swarrow
$\overline{}$	\leftharpoondown	\rightarrow	\rightharpoondown	_	\nwarrow
\rightleftharpoons	\rightleftharpoons	~ →	\leadsto		
>	\dashrightarrow	←	\dashleftarrow	\Leftarrow	\leftleftarrows
\Longrightarrow	$\$ leftrightarrows	\Leftarrow	\Lleftarrow	~~	\twoheadleftarrow
\longleftrightarrow	\leftarrowtail	\leftarrow	\looparrowleft	\leftrightharpoons	\leftrightharpoons
$ \leftarrow $	\curvearrowleft	Q	\circlearrowleft	$ \uparrow $	\Lsh
$\uparrow\uparrow$	\upuparrows	1	\upharpoonleft	1	\downharpoonleft
_	\multimap	~~~	$\$ leftrightsquigarrow	\Rightarrow	\rightrightarrows
ightleftarrows	$\$ rightleftarrows	\Rightarrow	\rightrightarrows	$\stackrel{\longleftarrow}{\longleftrightarrow}$	\rightleftarrows
\longrightarrow	$\$ twoheadrightarrow	\rightarrowtail	\rightarrowtail	\rightarrow	\looparrowright
\rightleftharpoons	$\$ rightleftharpoons	\curvearrowright	\curvearrowright	\bigcirc	\circlearrowright
Γ,	\Rsh	$\downarrow\downarrow$	\downdownarrows	1	\upharpoonright
ļ	\downharpoonright	~ →	\rightsquigarrow		
↔	\nleftarrow	$\rightarrow \rightarrow$	\nrightarrow	#	\nLeftarrow
\Rightarrow	\n Rightarrow	$\leftrightarrow \rightarrow$	\nleftrightarrow	#	\n

8 Miscellaneous symbols

∞	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	\forall	\forall	\Bbbk	\Bbbk	Ø	\wp
∇	\nabla	3	\exists	*	\bigstar	_	\angle
∂	\partial	∄	\nexists		\diagdown	4	\measuredangle
ð	\eth	Ø	\emptyset	/	\diagup	⋖	\sphericalangle
*	\clubsuit	Ø	\varnothing	\Diamond	\Diamond	C	\complement
\Diamond	\diamondsuit	\imath	\imath	Е	\Finv	∇	\triangledown
\Diamond	\heartsuit	Ĵ	\jmath	G	\Game	\triangle	\triangle
\spadesuit	\spadesuit	ℓ	\ell	\hbar	\hbar	Δ	\vartriangle
	\cdots	ſſſſ	\iiiint	\hbar	\hslash	•	\blacklozenge
÷	\vdots	ſſſ	\iiint	\Diamond	\lozenge		\blacksquare
	\ldots	ĴĴ	\iint	Ω	\mho	A	\blacktriangle
٠	\ddots	#	\sharp	,	\prime	▼	\blacktrinagledown
\Im	\Im	þ	\flat		\square	1	\backprime
\Re	\Re	Ц	\natural	$\sqrt{}$	\surd	\bigcirc	\circledS

9 Math mode accents

$cute{a}$	$\texttt{\acute}\{a\}$	\bar{a}	$\operatorname{\mathtt{ar}}\{a\}$	Á	\Acute{\Acute{A}}	$ar{ar{A}}$	\Bar{\Bar{A}}
$reve{a}$	$\texttt{\breve}\{a\}$	\check{a}	$\verb+\check+\{a\}$	Ă	\Breve{\Breve{A}}	Å	$\Check{\Check{A}}$
\ddot{a}	\dot{a}	\dot{a}	\dot{a}	Ä	$\Ddot{\Ddot{A}}$	\dot{A}	\Dot{\Dot{A}}
\grave{a}	$\texttt{\grave}\{a\}$	\hat{a}	\hat{a}	À	\Grave{\Grave{A}}	$\hat{\hat{A}}$	\Hat{\Hat{A}}
\tilde{a}	$\verb \tilde \{a\}$	\vec{a}	$\operatorname{\vec}\{a\}$	$ ilde{ ilde{A}}$	<pre>\Tilde{\Tilde{A}}</pre>	$ec{ec{A}}$	$\Vec{\Vec{A}}$

10 Array environment, examples

 $\operatorname{begin{array}\{\mathit{cols}\}\ \mathit{row}_1 \setminus \mathit{row}_2 \setminus \ldots \mathit{row}_m}$ Simplest version: where cols includes one character [lrc] for each column (with optional characters | inserted for vertical lines) and row_i includes character & a total of (n-1) times to separate the n elements in the row. Examples:

\left(\begin{array}{cc} 2\tau & 7\phi-frac5{12} \\ 3\psi & \frac{\pi}8 \end{array} \right) \left(\begin{array}{c} x \\ y \end{array} \right) \mbox{~and~} \left[\begin{array}{cc|r} 3 & 4 & 5 \\ 1 & 3 & 729 \end{array} \right]

$$\left(\begin{array}{cc} 2\tau & 7\phi - \frac{5}{12} \\ 3\psi & \frac{\pi}{8} \end{array} \right) \left(\begin{array}{c} x \\ y \end{array} \right) \text{ and } \left[\begin{array}{cc} 3 & 4 & 5 \\ 1 & 3 & 729 \end{array} \right]$$

\left\{ \begin{array}{rcl} \overline{\overline{z^2}+\cos z} & \mbox{for} & $|z| < 3 \setminus 0$ & \mbox{for} & $3 \leq z \leq 1$ $\sin\operatorname{verline}\{z\} \ \& \mbox\{for\} \ \& \ |z| > 5$ \end{array}\right.

$$f(z) = \begin{cases} \overline{\overline{z^2} + \cos z} & \text{for } |z| < 3\\ 0 & \text{for } 3 \le |z| \le 5\\ \sin \overline{z} & \text{for } |z| > 5 \end{cases}$$

11 Other Styles (math mode only)

Caligraphic letters: $\mathcal{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$

Mathbb letters: \$\mathbb{A}\$ etc.: ABCDEFGHIJKLMNOPQRSTUVWXYZ

Mathfrak letters: \$\mathfrak{A}\$ etc.: ABCDEFGHTJRLMNOPQRGTUVWXYJabc123

Math Sans serif letters: \$\mathsf{A}\\$ etc.: ABCDEFGHIJKLMNOPQRSTUVWXYZabc123

Math bold italic letters: define \def\mathbi#1{\textbf{\em #1}} then use \$\mathbi{A}\$ etc.: ABCDEFGHIJKLMNOPQRSTUVWXYZ abc 123

12 Font sizes

 $\int f^{-1}(x - x_a) dx$ $\int f^{-1}(x - x_a) dx$ Math Mode: $\int f^{-1}(x-x_a) dx$

 ${\text {\rm f}^{-1}(x-x_a)\,,dx}$ ${\left(-1\right) (x-x_a)\,dx}$ ${\c f^{-1}(x-x_a)\,dx}$

 ${\sigma^{-1}(x-x_a)\,dx}$

Text Mode:

 $\forall tiny = smallest$ \scriptsize = very small $\footnotesize = smaller$

\Large = Large VLARGE = LARGE

 $\normalsize = normal$

\huge = huge Huge = Huge

Text Mode: Accents and Symbols 13

 $\sl = small$

\'{o} \'{o} \"{o} \^{o} \~{o} ó ö ô ò ō \={o} \d s o \d{o} \.{o} \u{o} \H{o} \t{oo} \c{o} \r s ″ ∖H s ō \b{o} Ă \AA å \aa \ss \i \j 1 J Ø \0 \P \S \0 $\widehat{\mathbf{s}}$ \t s \v s Ø Æ \ae \AE \dag \ddag \copyright \pounds