LaTeX Math Symbols

Prepared by L. Kocbach, on the basis of this document (origin: David Carlisle, Manchester University)

File A.tex contains all necessary code
This file is prepared by running
latex A.tex
and cutting the pictures out of the resulting preview. Relevant parts of the latex code are reproduced under each of the pictures.
Some of the symbols have an explanatory text. This text is found in the latex code, mostly stating that they are parts of some spacial setup and cannot be used in standard LaTeX. Each of the figures also has a link to itself.

Greek Letters

α	\alpha	θ	\theta	o	o	τ	\tau
β	\beta	ϑ	\vartheta	π	\pi	υ	\ups
γ	\gamma	γ	\gamma	ϖ	\varpi	ϕ	\phi
δ	\delta	κ	\kappa	ρ	\rho	φ	\var
ϵ	\epsilon	λ	\lambda	ϱ	\varrho	χ	\chi
ε	\varepsilon	μ	\mu	σ	\sigma	ψ	\psi
ζ	\zeta	ν	\nu	ς	\varsigma	ω	\ome
η	\eta	ξ	\xi				
Γ	\Gamma	Λ	\Lambda	Σ	\Sigma	Ψ	\Psi
Δ	\Delta	Ξ	\Xi	Υ	\Upsilon	Ω	\Ome
Θ	\Theta	Π	\Pi	Φ	\Phi		

Table 1: Greek Letters

t1.gif

```
\begin{table}
\begin{tabular}{*8l}
\X\alpha        &\X\theta       &\X o           &\X\tau         \\
\X\beta         &\X\vartheta    &\X\pi          &\X\upsilon     \\
\X\gamma        &\X\gamma       &\X\varpi       &\X\phi         \\
```

```
\X\delta        &\X\kappa       &\X\rho          &\X\varphi      \\
\X\epsilon      &\X\lambda      &\X\varrho       &\X\chi         \\
\X\varepsilon   &\X\mu          &\X\sigma        &\X\psi         \\
\X\zeta         &\X\nu          &\X\varsigma     &\X\omega       \\
\X\eta          &\X\xi                                         \\
                                                             \\
\X\Gamma        &\X\Lambda      &\X\Sigma        &\X\Psi         \\
\X\Delta        &\X\Xi          &\X\Upsilon      &\X\Omega       \\
\X\Theta        &\X\Pi          &\X\Phi
\end{tabular}
\caption{Greek Letters}\label{greek}
\end{table}
```

Binary Operation Symbols

±	\pm	∩	\cap	◇	\diamond	⊕	\
∓	\mp	∪	\cup	△	\bigtriangleup	⊖	\
×	\times	⊎	\uplus	▽	\bigtriangledown	⊗	\
÷	\div	⊓	\sqcap	◁	\triangleleft	⊘	\
*	\ast	⊔	\sqcup	▷	\triangleright	⊙	\
⋆	\star	∨	\vee	◁	\lhd^b	◯	\
∘	\circ	∧	\wedge	▷	\rhd^b	†	\
•	\bullet	\	\setminus	⊴	\unlhd^b	‡	\
·	\cdot	≀	\wr	⊵	\unrhd^b	⨿	\
+	+	−	-				

t2.gif

```
\begin{table}
\begin{tabular}{*8l}
\X\pm           &\X\cap         &\X\diamond             &\X\oplus
\X\mp           &\X\cup         &\X\bigtriangleup       &\X\ominus
\X\times        &\X\uplus       &\X\bigtriangledown     &\X\otimes
\X\div          &\X\sqcap       &\X\triangleleft        &\X\oslash
\X\ast          &\X\sqcup       &\X\triangleright       &\X\odot
\X\star         &\X\vee         &\X\lhd$^b$             &\X\bigcirc
\X\circ         &\X\wedge       &\X\rhd$^b$             &\X\dagger
```

```
\X\bullet       &\X\setminus    &\X\unlhd$^b$          &\X\ddagger
\X\cdot         &\X\wr          &\X\unrhd$^b$          &\X\amalg
\X+             &\X-
\end{tabular}

$^b$ Not predefined in a format based on {\tt basefont.tex}.
     Use one of the style options\\
     {\tt oldlfont}, {\tt newlfont}, {\tt amsfonts} or {\tt amssymb}.

\caption{Binary Operation Symbols}\label{bin}
\end{table}
```

Relation Symbols

$\leq$	\leq	$\geq$	\geq	$\equiv$	\equiv	$\models$	\mo
$\prec$	\prec	$\succ$	\succ	$\sim$	\sim	$\perp$	\pe
$\preceq$	\preceq	$\succeq$	\succeq	$\simeq$	\simeq	$\mid$	\mi
$\ll$	\ll	$\gg$	\gg	$\asymp$	\asymp	$\parallel$	\pa
$\subset$	\subset	$\supset$	\supset	$\approx$	\approx	$\bowtie$	\bo
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong	$\Join$	\Jo
$\sqsubset^b$	\sqsubset^b	$\sqsupset^b$	\sqsupset^b	$\neq$	\neq	$\smile$	\sm
$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq	$\doteq$	\doteq	$\frown$	\fr
$\in$	\in	$\ni$	\ni	$\propto$	\propto	$=$	=
$\vdash$	\vdash	$\dashv$	\dashv	$<$	<	$>$	>
:	:						

t3.gif

```
\begin{table}
\begin{tabular}{*8l}
\X\leq          &\X\geq         &\X\equiv       &\X\models      \\
\X\prec         &\X\succ        &\X\sim         &\X\perp        \\
\X\preceq       &\X\succeq      &\X\simeq       &\X\mid         \\
\X\ll           &\X\gg          &\X\asymp       &\X\parallel    \\
\X\subset       &\X\supset      &\X\approx      &\X\bowtie      \\
\X\subseteq     &\X\supseteq    &\X\cong        &\X\Join$^b$    \\
\X\sqsubset$^b$ &\X\sqsupset$^b$&\X\neq         &\X\smile       \\
\X\sqsubseteq   &\X\sqsupseteq  &\X\doteq       &\X\frown       \\
\X\in           &\X\ni          &\X\propto      &\X=            \\
```

```
\X\vdash        &\X\dashv       &\X<             &\X>             \\
\X:
\end{tabular}

$^b$ Not predefined in a format based on {\tt basefont.tex}.
     Use one of the style options\\
     {\tt oldlfont}, {\tt newlfont}, {\tt amsfonts} or {\tt amssymb}.

\caption{Relation Symbols}\label{rel}
\end{table}
```

Punctuation Symbols

, , ; ; : \colon . \ldotp · \cdotp

Table 4: Punctuation Symbols

t4.gif

```
\begin{table}
\begin{tabular}{*{5}{lp{3.2em}}}
\X,     &\X;    &\X\colon       &\X\ldotp       &\X\cdotp
\end{tabular}
\caption{Punctuation Symbols}\label{punct}
\end{table}
```

Arrow Symbols

$\leftarrow$	\leftarrow	$\longleftarrow$	\longleftarrow	$\uparrow$	
$\Leftarrow$	\Leftarrow	$\Longleftarrow$	\Longleftarrow	$\Uparrow$	
$\rightarrow$	\rightarrow	$\longrightarrow$	\longrightarrow	$\downarrow$	
$\Rightarrow$	\Rightarrow	$\Longrightarrow$	\Longrightarrow	$\Downarrow$	
$\leftrightarrow$	\leftrightarrow	$\longleftrightarrow$	\longleftrightarrow	$\updownarrow$	
$\Leftrightarrow$	\Leftrightarrow	$\Longleftrightarrow$	\Longleftrightarrow	$\Updownarrow$	
$\mapsto$	\mapsto	$\longmapsto$	\longmapsto	$\nearrow$	
$\hookleftarrow$	\hookleftarrow	$\hookrightarrow$	\hookrightarrow	$\searrow$	
$\leftharpoonup$	\leftharpoonup	$\rightharpoonup$	\rightharpoonup	$\swarrow$	
$\leftharpoondown$	\leftharpoondown	$\rightharpoondown$	\rightharpoondown	$\nwarrow$	
$\rightleftharpoons$	\rightleftharpoons	$\leadsto^b$	\leadsto^b		

t5.gif

```
\begin{table}
\begin{tabular}{*6l}
\X\leftarrow            &\X\longleftarrow       &\X\uparrow     \\
\X\Leftarrow            &\X\Longleftarrow       &\X\Uparrow     \\
\X\rightarrow           &\X\longrightarrow      &\X\downarrow   \\
\X\Rightarrow           &\X\Longrightarrow      &\X\Downarrow   \\
\X\leftrightarrow       &\X\longleftrightarrow  &\X\updownarrow \\
\X\Leftrightarrow       &\X\Longleftrightarrow  &\X\Updownarrow \\
\X\mapsto               &\X\longmapsto          &\X\nearrow     \\
\X\hookleftarrow        &\X\hookrightarrow      &\X\searrow     \\
\X\leftharpoonup        &\X\rightharpoonup      &\X\swarrow     \\
\X\leftharpoondown      &\X\rightharpoondown    &\X\nwarrow     \\
\X\rightleftharpoons    &\X\leadsto$^b$
\end{tabular}

$^b$ Not predefined in a format based on {\tt basefont.tex}.
     Use one of the style options\\
     {\tt oldlfont}, {\tt newlfont}, {\tt amsfonts} or {\tt amssymb}.

\caption{Arrow Symbols}
\end{table}
```

Miscellaneous Symbols

…	\ldots	⋯	\cdots	⋮	\vdots	⋱	\ddots
ℵ	\aleph	′	\prime	∀	\forall	∞	\infty
ℏ	\hbar	∅	\emptyset	∃	\exists	□	\Box^b
ı	\imath	∇	\nabla	¬	\neg	◇	\Diamo
ȷ	\jmath	√	\surd	♭	\flat	△	\trian
ℓ	\ell	⊤	\top	♮	\natural	♣	\clubs
℘	\wp	⊥	\bot	♯	\sharp	◇	\diamo
ℜ	\Re	∥	\\|	\	\backslash	♡	\heart
ℑ	\Im	∠	\angle	∂	\partial	♠	\spade
℧	\mho^b	.	.	|	|		

t6.gif

```
\begin{table}
\begin{tabular}{*8l}
\X\ldots        &\X\cdots       &\X\vdots       &\X\ddots       \\
\X\aleph        &\X\prime       &\X\forall      &\X\infty       \\
\X\hbar         &\X\emptyset    &\X\exists      &\X\Box$^b$     \\
\X\imath        &\X\nabla       &\X\neg         &\X\Diamond$^b$ \\
\X\jmath        &\X\surd        &\X\flat        &\X\triangle    \\
\X\ell          &\X\top         &\X\natural     &\X\clubsuit    \\
\X\wp           &\X\bot         &\X\sharp       &\X\diamondsuit \\
\X\Re           &\X\|           &\X\backslash   &\X\heartsuit   \\
\X\Im           &\X\angle       &\X\partial     &\X\spadesuit   \\
\X\mho$^b$      &\X.            &\X|
\end{tabular}

$^b$ Not predefined in a format based on {\tt basefont.tex}.
     Use one of the style options\\
     {\tt oldlfont}, {\tt newlfont}, {\tt amsfonts} or {\tt amssymb}.

\caption{Miscellaneous Symbols}\label{ord}
\end{table}
```

Variable-sized Symbols

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

Table 7: Variable-sized Symbols

t7.gif

```
\begin{table}
\begin{tabular}{*6l}
\X\sum          &\X\bigcap      &\X\bigodot     \\
\X\prod         &\X\bigcup      &\X\bigotimes   \\
\X\coprod       &\X\bigsqcup    &\X\bigoplus    \\
\X\int          &\X\bigvee      &\X\biguplus    \\
\X\oint         &\X\bigwedge
\end{tabular}
\caption{Variable-sized  Symbols}\label{op}
\end{table}
```

Log-like Symbols

\arccos	\cos	\csc	\exp	\ker	\limsup	\min	\
\arcsin	\cosh	\deg	\gcd	\lg	\ln	\Pr	\
\arctan	\cot	\det	\hom	\lim	\log	\sec	\
\arg	\coth	\dim	\inf	\liminf	\max	\sin	\

Table 8: Log-like Symbols

t8.gif

```
\begin{table}
\begin{tabular}{*8l}
\Z\arccos &\Z\cos  &\Z\csc &\Z\exp &
          \Z\ker    &\Z\limsup &\Z\min &\Z\sinh \\
```

```
\Z\arcsin &\Z\cosh &\Z\deg &\Z\gcd &
          \Z\lg    &\Z\ln    &\Z\Pr  &\Z\sup  \\
\Z\arctan &\Z\cot  &\Z\det &\Z\hom &
          \Z\lim   &\Z\log   &\Z\sec &\Z\tan  \\
\Z\arg    &\Z\coth &\Z\dim &\Z\inf &
          \Z\liminf &\Z\max   &\Z\sin &\Z\tanh
\end{tabular}
\caption{Log-like Symbols}\label{log}
\end{table}
```

Delimiters

(	(	)	)	↑	\uparrow	⇑	\Uparrow
[	[	]	]	↓	\downarrow	⇓	\Downarrow
{	\{	}	\}	↕	\updownarrow	⇕	\Updownarrow
⌊	\lfloor	⌋	\rfloor	⌈	\lceil	⌉	\rceil
⟨	\langle	⟩	\rangle	/	/	\	\backslash
∣	|	∥	\\|				

Table 9: Delimiters

t9.gif

```
\begin{table}
\begin{tabular}{*8l}
\X(             &\X)            &\X\uparrow     &\X\Uparrow     \\
\X[             &\X]            &\X\downarrow   &\X\Downarrow   \\
\X\{            &\X\}           &\X\updownarrow &\X\Updownarrow \\
\X\lfloor       &\X\rfloor      &\X\lceil       &\X\rceil       \\
\X\langle       &\X\rangle      &\X/            &\X\backslash   \\
\X|             &\X\|
\end{tabular}
\caption{Delimiters\label{dels}}
\end{table}
```

Large Delimiters

⎱	\rmoustache	⎰	\lmoustache	⟭	\rgroup	⟮	
⏐	\arrowvert	‖	\Arrowvert	⏐	\bracevert		

Table 10: Large Delimiters

t10.gif

```
\begin{table}
\begin{tabular}{*8l}
\Y\rmoustache&  \Y\lmoustache&  \Y\rgroup&      \Y\lgroup\\[5pt]
\Y\arrowvert&   \Y\Arrowvert&   \Y\bracevert
\end{tabular}
\caption{Large Delimiters\label{ldels}}
\end{table}
```

Math mode accents

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

Table 11: Math mode accents

t11.gif

```
\begin{table}
\begin{tabular}{*{10}l}
\W\hat{a}     &\W\acute{a}  &\W\bar{a}    &\W\dot{a}    &\W\breve{a}\\
\W\check{a}   &\W\grave{a}  &\W\vec{a}    &\W\ddot{a}   &\W\tilde{a}\\
\end{tabular}
\caption{Math mode accents}\label{accent}
\end{table}
\begin{table}
```

Some other constructions

$\widetilde{abc}$	\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}	$\sqrt[n]{abc}$	\sqrt[n]{abc}
f'	f'	$\frac{abc}{xyz}$	\frac{abc}{xyz}

Table 12: Some other constructions

t12.gif

```
\begin{table}
\begin{tabular}{*4l}
\W\widetilde{abc}       &\W\widehat{abc}                          \\
\W\overleftarrow{abc}   &\W\overrightarrow{abc}                   \\
\W\overline{abc}        &\W\underline{abc}                        \\
\W\overbrace{abc}       &\W\underbrace{abc}                       \\[5pt
\W\sqrt{abc}            &$\sqrt[n]{abc}$&\verb|\sqrt[n]{abc}|   \\
$f'$&\verb|f'|          &$\frac{abc}{xyz}$&\verb|\frac{abc}{xyz}|
\end{tabular}
\caption{Some other constructions}\label{other}
\end{table}
```