A Mathematical symbols

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

Table 1: Greek letters

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

[a] Not predefined in LaTeX 2ε. Use the packages `latexsym` or `amssymb`

Table 2: Binary operation symbols

$\leq$	\leq	$\geq$	\geq	$\equiv$	\equiv	$\models$	\models	$\prec$	\prec
$\succ$	\succ	$\sim$	\sim	$\perp$	\perp	$\preceq$	\preceq	$\succeq$	\succeq
$\simeq$	\simeq	$\mid$	\mid	$\ll$	\ll	$\gg$	\gg	$\asymp$	\asymp
$\parallel$	\parallel	$\subset$	\subset	$\supset$	\supset	$\approx$	\approx	$\bowtie$	\bowtie
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong	$\Join$	\Join	$\sqsubset$	\sqsubset
$\sqsupset$	\sqsupset	$\neq$	\neq	$\smile$	\smile	$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq
$\doteqdot$	\doteq	$\frown$	\frown	$\in$	\in	$\ni$	\ni	$\propto$	\propto
$=$	=	$\vdash$	\vdash	$\dashv$	\dashv	$<$	<	$>$	>

Table 3: Relation symbols

⎱	\rmoustache	⎰	\lmoustache	⎱	\rgroup	⎰	\lgroup
⎪	\arrowvert	‖	\Arrowvert	⎪	\bracevert		

Table 4: Large delimiters

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

Table 5: Delimiters

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

Table 6: Arrow symbols

…	\ldots	⋯	\cdots	⋮	\vdots	⋱	\ddots	ℵ	\aleph
′	\prime	∀	\forall	∞	\infty	ℏ	\hbar	∅	\emptyset
∃	\exists	∇	\nabla	√	\surd	□	\Box[a]	△	\triangle
◇	\Diamond[a]	𝚤	\imath	𝚥	\jmath	ℓ	\ell	¬	\neg
⊤	\top	♭	\flat	♮	\natural	♯	\sharp	℘	\wp
⊥	\bot	♣	\clubsuit	♢	\diamondsuit	♡	\heartsuit	♠	\spadesuit
℧	\mho[a]	ℜ	\Re	ℑ	\Im	∠	\angle	∂	\partial

[a] Not predefined in LaTeX 2ε. Use the packages `latexsym` or `amssymb`

Table 7: Miscellaneous symbols

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

Table 8: Log-like symbols

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

Table 9: Math mode accents

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

Table 10: Variable-sized symbols

$\widetilde{abc}$	\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 11: LaTeX math constructs

$\hbar$	\hbar	$\hbar$	\hslash	$\vartriangle$	\vartriangle
$\triangledown$	\triangledown	$\square$	\square	$\lozenge$	\lozenge
Ⓢ	\circledS	$\angle$	\angle	$\measuredangle$	\measuredangle
$\nexists$	\nexists	$\mho$	\mho	$\Finv$[a]	\Finv[a]
$\Game$[a]	\Game[a]	$\Bbbk$[a]	\Bbbk[a]	‵	\backprime
$\varnothing$	\varnothing	$\blacktriangle$	\blacktriangle	$\blacktriangledown$	\blacktriangledown
$\blacksquare$	\blacksquare	$\blacklozenge$	\blacklozenge	$\bigstar$	\bigstar
$\sphericalangle$	\sphericalangle	$\complement$	\complement	$\eth$	\eth
$\diagup$[a]	\diagup[a]	$\diagdown$[a]	\diagdown[a]		

[a] Not defined in style amssymb, define using the LaTeX 2_ε \DeclareMathSymbol command

Table 12: AMS miscellaneous symbols

$\digamma$	\digamma	$\varkappa$	\varkappa	$\beth$	\beth	$\daleth$	\daleth	$\gimel$	\gimel

Table 13: AMS Greek and Hebrew

$\ulcorner$	\ulcorner	$\urcorner$	\urcorner	$\llcorner$	\llcorner	$\lrcorner$	\lrcorner

Table 14: AMS delimiters

$\dashrightarrow$	\dashrightarrow	$\dashleftarrow$	\dashleftarrow	$\leftleftarrows$	\leftleftarrows
$\leftrightarrows$	\leftrightarrows	$\Lleftarrow$	\Lleftarrow	$\twoheadleftarrow$	\twoheadleftarrow
$\leftarrowtail$	\leftarrowtail	$\looparrowleft$	\looparrowleft	$\leftrightharpoons$	\leftrightharpoons
$\curvearrowleft$	\curvearrowleft	$\circlearrowleft$	\circlearrowleft	$\Lsh$	\Lsh
$\upuparrows$	\upuparrows	$\upharpoonleft$	\upharpoonleft	$\downharpoonleft$	\downharpoonleft
$\multimap$	\multimap	$\leftrightsquigarrow$	\leftrightsquigarrow	$\rightrightarrows$	\rightrightarrows
$\rightleftarrows$	\rightleftarrows	$\rightrightarrows$	\rightrightarrows	$\rightleftarrows$	\rightleftarrows
$\twoheadrightarrow$	\twoheadrightarrow	$\rightarrowtail$	\rightarrowtail	$\looparrowright$	\looparrowright
$\rightleftharpoons$	\rightleftharpoons	$\curvearrowright$	\curvearrowright	$\circlearrowright$	\circlearrowright
$\Rsh$	\Rsh	$\downdownarrows$	\downdownarrows	$\upharpoonright$	\upharpoonright
$\downharpoonright$	\downharpoonright	$\rightsquigarrow$	\rightsquigarrow		

Table 15: AMS arrows

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

Table 16: AMS negated arrows

$\dotplus$	\dotplus	$\smallsetminus$	\smallsetminus	$\Cap$	\Cap
$\Cup$	\Cup	$\barwedge$	\barwedge	$\veebar$	\veebar
$\doublebarwedge$	\doublebarwedge	$\boxminus$	\boxminus	$\boxtimes$	\boxtimes
$\boxdot$	\boxdot	$\boxplus$	\boxplus	$\divideontimes$	\divideontimes
$\ltimes$	\ltimes	$\rtimes$	\rtimes	$\leftthreetimes$	\leftthreetimes
$\rightthreetimes$	\rightthreetimes	$\curlywedge$	\curlywedge	$\curlyvee$	\curlyvee
$\circleddash$	\circleddash	$\circledast$	\circledast	$\circledcirc$	\circledcirc
$\centerdot$	\centerdot	$\intercal$	\intercal		

Table 17: AMS binary operators

≦	\leqq	⩽	\leqslant	⪕	\eqslantless
≲	\lesssim	⪅	\lessapprox	≊	\approxeq
⋖	\lessdot	⋘	\lll	≶	\lessgtr
⋚	\lesseqgtr	⪋	\lesseqqgtr	≒	\doteqdot
≓	\risingdotseq	≒	\fallingdotseq	∽	\backsim
⋍	\backsimeq	⫅	\subseteqq	⋐	\Subset
⊏	\sqsubset	≼	\preccurlyeq	⋞	\curlyeqprec
≾	\precsim	⪷	\precapprox	◁	\vartriangleleft
⊴	\trianglelefteq	⊨	\vDash	⊪	\Vvdash
⌣	\smallsmile	⌢	\smallfrown	≏	\bumpeq
≑	\Bumpeq	≧	\geqq	⩾	\geqslant
⪖	\eqslantgtr	≳	\gtrsim	⪆	\gtrapprox
⋗	\gtrdot	⋙	\ggg	≷	\gtrless
≩	\gtreqless	⪌	\gtreqqless	≗	\eqcirc
≗	\circeq	◁	\triangleq	∼	\thicksim
≈	\thickapprox	⫆	\supseteqq	⋑	\Supset
⊐	\sqsupset	≽	\succcurlyeq	⋟	\curlyeqsucc
≿	\succsim	⪸	\succapprox	▷	\vartriangleright
⊵	\trianglerighteq	⊩	\Vdash	∣	\shortmid
∥	\shortparallel	≬	\between	⋔	\pitchfork
∝	\varpropto	◀	\blacktriangleleft	∴	\therefore
϶	\backepsilon	▶	\blacktriangleright	∵	\because

Table 18: AMS binary relations

≮	\nless	≰	\nleq	⪇	\nleqslant
≨	\lneqq	⪇	\lneq	⋦	\lneqq
⋦	\lvertneqq	⋦	\lnsim	⪉	\lnapprox
⊀	\nprec	⪯̸	\npreceq	⋨	\precnsim
⪹	\precnapprox	≁	\nsim	∤	\nshortmid
∤	\nmid	⊬	\nvdash	⊭	\nvDash
⋪	\ntriangleleft	⋬	\ntrianglelefteq	⊈	\nsubseteq
⊊	\subsetneq	⊊	\varsubsetneq	⫋	\subsetneqq
⫋	\varsubsetneqq	≯	\ngtr	≱	\ngeq
≱	\ngeqslant	≱	\ngeqq	≩	\gneq
≩	\gneqq	≩	\gvertneqq	⋧	\gnsim
⪊	\gnapprox	⊁	\nsucc	⪰̸	\nsucceq
⋩	\succnsim	⪺	\succnapprox	≆	\ncong
∦	\nshortparallel	∦	\nparallel	⊯	\nvDash
⊯	\nVDash	⋫	\ntriangleright	⋭	\ntrianglerighteq
⊈	\nsupseteq	⊉	\nsupseteqq	⊋	\supsetneq
⊋	\varsupsetneq	⫌	\supsetneqq	⫌	\varsupsetneqq

Table 19: AMS negated binary relations

B Horrible Mathematical Examples to Study

$$\phi(t) = \frac{1}{\sqrt{2\pi}} \int_0^t e^{-x^2/2} dx \tag{2}$$

```
\begin{equation}
  \phi(t)=\frac{1}{\sqrt{2\pi}}
  \int^t_0 e^{-x^2/2} dx
\end{equation}
```

$$\prod_{j\geq 0} \left(\sum_{k\geq 0} a_{jk} z^k \right) = \sum_{k\geq 0} z^n \left(\sum_{\substack{k_0,k_1,\ldots\geq 0 \\ k_0+k_1+\ldots=n}} a_0 k_0 a_{1\,k_1} \ldots \right) \tag{3}$$

```
\begin{equation}
  \prod_{j\geq 0}
  \left(\sum_{k\geq 0}a_{jk} z^k\right)
= \sum_{k\geq 0} z^n
  \left( \sum_{{k_0,k_1,\ldots\geq 0}
           \atop{k_0+k_1+\ldots=n}    }
         a{_0k_0}a_{1k_1}\ldots  \right)
\end{equation}
```

$$\pi(n) = \sum_{m=2}^{n} \left\lfloor \left(\sum_{k=1}^{m-1} \lfloor (m/k)/\lceil m/k \rceil \rfloor \right)^{-1} \right\rfloor \tag{4}$$

```
\begin{equation}
\pi(n) = \sum_{m=2}^{n}
  \left\lfloor \left(\sum_{k=1}^{m-1}
       \lfloor(m/k)/\lceil m/k\rceil
       \rfloor \right)^{-1}
  \right\rfloor
\end{equation}
```

$$\{\overbrace{a,\ldots,a}^{k\ a's},\overbrace{b,\ldots,b}^{l\ b's}\}_{k+1 \text{ elements}} \tag{5}$$

```
\begin{equation}
\{\underbrace{%
    \overbrace{\mathstrut a,\ldots,a}^{k\ a's},
    \overbrace{\mathstrut b,\ldots,b}^{l\ b's}}
  _{k+1\ \mathrm{elements}}                    \}
\end{equation}
```

$$\mathrm{W}^+ \begin{array}{l} \nearrow \mu^+ + \nu_\mu \\ \rightarrow \pi^+ + \pi^0 \\ \rightarrow \kappa^+ + \pi^0 \\ \searrow \mathrm{e}^+ + \nu_\mathrm{e} \end{array}$$

```
\begin{displaymath}
\mbox{W}^+\
\begin{array}{l}
\nearrow\raise5pt\hbox{$\mu^+ + \nu_{\mu}$}\\
\rightarrow         \pi^+ +\pi^0         \\[5pt]
\rightarrow \kappa^+ +\pi^0              \\
\searrow\lower5pt\hbox{$\mathrm{e}^+
          +\nu_{\scriptstyle\mathrm{e}}$}
\end{array}
\end{displaymath}
```

$$F(x,y) = 0 \quad \text{and} \quad \begin{vmatrix} F''_{xx} & F''_{xy} & F'_x \\ F''_{yx} & F''_{yy} & F'_y \\ F'_x & F'_y & 0 \end{vmatrix} = 0$$

```
\begin{displaymath}
{F}(x,y)=0\quad\mathrm{and}\quad
 \left|\begin{array}{ccc}
  F_{xx}'' & F_{xy}'' & F_{x}' \\
  F_{yx}'' & F_{yy}'' & F_{y}' \\
  F_{x}'   & F_{y}'   & 0
       \end{array}      \right| =0
\end{displaymath}
```

$$\frac{\pm\begin{vmatrix} x_1-x_2 & y_1-y_2 & z_1-z_2 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix}}{\sqrt{\begin{vmatrix} l_1 & m_1 \\ l_2 & m_2 \end{vmatrix}^2+\begin{vmatrix} m_1 & n_1 \\ n_1 & l_1 \end{vmatrix}^2+\begin{vmatrix} m_2 & n_2 \\ n_2 & l_2 \end{vmatrix}^2}}$$

```
\begin{displaymath}
\frac{\pm
\left|\begin{array}{ccc}
x_1-x_2  & y_1-y_2 & z_1-z_2 \\
l_1      & m_1     & n_1     \\
l_2      & m_2     & n_2
\end{array}\right|}{
\sqrt{\left|\begin{array}{cc}l_1&m_1\\
l_2&m_2\end{array}\right|^2
+     \left|\begin{array}{cc}m_1&n_1\\
n_1&l_1\end{array}\right|^2
+     \left|\begin{array}{cc}m_2&n_2\\
n_2&l_2\end{array}\right|^2}}
\end{displaymath}
```

$$\begin{aligned}\sigma_0^f(Q,T_{3R},\beta,s) &= \frac{4\pi\alpha^2}{3s}\beta\left[\times\frac{Q^2\left\{3-\frac{\beta^2}{2}\right\}-2QC_{\rm V}C'_{\rm V}s(s-M_{\rm Z)}^2}{(s-M_{\rm Z)}^2{}^2+M_{\rm Z}^2\Gamma_{\rm Z}^2\left\{\frac{3-\beta^2}{2}\right\}}\right. \\ &+ \left.\frac{(C_{\rm V}^2+C_{\rm A}^2)s^2}{(s-M_{\rm Z)}^2{}^2+M_{\rm Z}^2\Gamma_{\rm Z}^2\left\{C'^2_{\rm V}\left\{\frac{3-\beta^2}{2}\right\}+C'^2_{\rm A}\{\beta^2\}\right\}}\right] \end{aligned} \tag{6}$$

```
\newcommand{\CA}{C_{\rm A}}     \newcommand{\CV}{C_{\rm V}}
\newcommand{\CPA}{{C'}_{\rm A}} \newcommand{\CPV}{{C'}_{\rm V}}
\newcommand{\GZ}{\Gamma^2_{\rm Z}}
\newcommand{\MZ}{M^2_{\rm Z}}   \newcommand{\MZs}{{(s-M^2_{\rm Z})}}
\newcommand{\BE}{\left\{\frac{\displaystyle 3-\beta^2}{\displaystyle 2}\right\}}
\begin{eqnarray}
\sigma^f_0(Q,T_{3R},\beta,s) & = &
      \frac{4\pi\alpha^2}{3s}\beta \times
        \left[ \frac{Q^2 \BE - 2Q \CV \CPV s \MZs}{\MZs^2 + \MZ \GZ \BE}
            \right.                                          \nonumber \\[-3mm]
                                &   &                                \\[-3mm]
                                & + &
      \left.\frac{(\CV^2 + \CA^2) s^2}%
                 {\MZs^2+\MZ\GZ\left\{\CPV^2 \BE+\CPA^2 \{\beta^2\}\right\}}
        \right]                                              \nonumber
\end{eqnarray}
```

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