1 Symbols

Mainly based on physics package

Macro	Usage	Effect	Comments
\quantity	\qty(\frac{b}{a})	$\left(\frac{b}{a}\right)$	Automatic bracing: (), [], {}, ||
	\pqty{a}	(a)	\pqty: (); \bqty: []; \vqty: ||; \Bqty: {}
Bracing			* for no resize, manual bracing: \big, \Big, \bigg, \Bigg
\absolutevalue	\abs{a}	$\lvert a \rvert$	Absoluevalue
\norm	\norm{a}	$\lVert a \rVert$	Norm
\opnorm	\opnorm{a}	$\lvert\lvert\lvert a \rvert\rvert\rvert$	Operator norm
\evaluated	\eval{a}_0^1	$a\Big\vert_0^1$	Evaluation, also \eval(a| _0^1; \eval[a| _0^1
\order	\order{a}	$\mathcal{O}(a)$	Order
\commutator	\comm{a}{b}	$[a,b]$	Commutator
\anticommutator	\acomm{a}{b}	$\{a,b\}$	Anti-commutator
\poissonbracket	\pb{a}{b}	$\{a,b\}$	Poison bracket

Vector			
\vectorbold	\vb{a}	$\mathbf{a}$	Vector as bold (no Greek), * for italic and Greek
\vectorarrow	\va{a}	$\vec{\mathbf{a}}$	Vector with arrow (no Greek), * for italic and Greek
\vectorunit	\vu{a}	$\hat{\mathbf{a}}$	With hat (no Greek), * for italic and Greek
\dotproduct	\vdot	$\cdot$	Dot product (bold cdot)
\crossproduct	\cross	$\times$	or \cp
\gradient	\grad{a}	$\boldsymbol{\nabla} a$	Also valid for (), []. with *arrowdel* command, it's changed to vector mode
\divergence	\div{a}	$\boldsymbol{\nabla} \cdot a$	Also valid for (), [].
\laplacian	\laplacian{a}	$\nabla^2 a$	Also valid for (), [].

Derivatives			
\differential	\dd{a}	$\mathrm{d}a$	Differential symbol; also valid for ()
	\dd[3]{a}	$\mathrm{d}^3 a$	Power
\variation	\var[3]{a}	$\delta^3 a$	Variation of functional; works as \dd.
\derivative	\dv[2]{a}	$\frac{\mathrm{d}^2}{\mathrm{d}a^2}$	Derivative, powers available with []
	\dv{f}{a}	$\frac{\mathrm{d}f}{\mathrm{d}a}$	Two arguments
	\dv{a}(f)	$\frac{\mathrm{d}}{\mathrm{d}a}(f)$	Low form
	\dv*{f}{a}	$\mathrm{d}f/\mathrm{d}a$	Inline form
\partialderivative	\pdv{f}{a}	$\frac{\partial f}{\partial a}$	Partial derivative. same to \dv.
	\pdv{f}{x}{y}	$\frac{\partial^2 f}{\partial x \partial y}$	Can take two variables
\functionalderivative	\fdv{F}{g}	$\frac{\delta F}{\delta g}$	Functional derivative; works as \dv
Dirac notation			* for no resize
\ket	\ket{a}	$\lvert a \rangle$	Ket
\bra	\bra{a}	$\langle a \rvert$	Bra
	\bra{a}\ket{b}	$\langle a \vert b \rangle$	Auto contraction
\innerproduct	\braket{a}{b}	$\langle a \vert b \rangle$	Braket. Also \ip
	\braket{a}	$\langle a \vert a \rangle$	Norm
\outerproduct	\ketbra{a}{b}	$\lvert a \rangle\langle b \rvert$	Outer, also \op or \dyad
\expectationvalue	\expval{A}	$\langle A \rangle$	Expectation value (implicit), also \ev. (Resize doesn't include A, ** to include)

	\expval{A}{n}	$\langle n\|A\|n\rangle$	Expectation value (explicit)
\matrixelement	\mel{n}{A}{m}	$\langle n\|A\|m\rangle$	Matrix element, also \matrixel. (Resize doesn't include A, ** to include)
Matrix			
\matrixquantity	\mqty{a& b\\c& d}	$\begin{matrix} a & b \\ c & d \end{matrix}$	Matrix, can be grouped as elements in larger matrix. Also works with (), *(), [], |||. \pmqty: (); \Pmqty:* (); \bmqty: []; \vmqty: |||
\smallmatrixquantity	\smqty{a& b\\c& d}	$\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right)$	Small matrix, same as above
\matrixdeterminant	\mdet{a}	$\begin{vmatrix} a \end{vmatrix}$	Determinant;
	\smdet{a}	$\left\lvert \begin{smallmatrix} a \end{smallmatrix} \right\rvert$	Determinant, small version
\identitymatrix	\imat{3}	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	Identity Matrix
\xmatrix	\xmat{x}{2}{3}	$\begin{matrix} x & x & x \\ x & x & x \end{matrix}$	Matrix filled with x
	\xmat*{a}{2}{3}	$\begin{matrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \end{matrix}$	* assign indices to elements
\zeromatrix	\zmat{2}{3}	$\begin{matrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{matrix}$	Zero matrix
\paulimatrix	\pmat{1}	$\begin{matrix} 0 & 1 \\ 1 & 0 \end{matrix}$	Pauli [0, 1, 2, 3] matrix
\diagonalmatrix	\dmat{a, b}	$\begin{matrix} a & \\ & b \end{matrix}$	Diagonal matrix, up to 8 elements, add [0] option to fill with 0. matrix can be inputted as entries as well.
\antidiagonalmatrix	\admat{a,b}	$\begin{matrix} & a \\ b & \end{matrix}$	Anti-diagonal matrix, as above.
Text in math mode			Insert text in math mode, including spacing. Special macros see table 2.
\qqtext	1 \qq{word} 2	1 word 2	with *, only include spacing at the end.

Table 2: Text in math mode

\qcc	\qif	\qthen	\qotherwise
\qunless	\qgiven	\qusing	\qassume
\qsince	\qlet	\qfor	\qall
\qeven	\qinteger	\qand	\qor
\qas	\qin		

1	c.c.	1	1	if	1	1	then	1	1	otherwise	1
1	unless	1	1	given	1	1	using	1	1	assume	1
1	since	1	1	let	1	1	for	1	1	all	1
1	even	1	1	integer	1	1	and	1	1	or	1
1	as	1	1	in	1						

Other special functions:

The functions in Tab. 3 can be used as \sin[2](x): $\sin^2(x)$, which handles the sizing and powers.

The functions in Tab. 4 can be used as \max[2]{x}: $\max_2\{x\}$, which handles the sizing and subscript (traditional typeset \max_2 is still available). In display mode, it is

$$\max_2\{x\}$$

The functions in Tab. 5 can be used with automatic sizing of [], (), and {}:
Following functions can be used with conditions:
Following functions are provided as plain text:
The following symbols are defined
Also, some special operators are provided:
\principalvalue or \pv{f}: $\mathcal{P}f$, \PV{f}: P.V.f, \Re: Re$\{z\}$, \Im: Im$\{z\}$.

2 Marks and Colors

Several shortcut for colors are provided with the *xcolor* package:
\red, \blue, \green
Also the hyperrefs are colored:

1. In document ref: dummy target
2. cite: [1]
3. url: www.dummyurl

The marks are provided by the *soul* package

1. \so: s p a c e o u t
2. \ul: underline
3. \st: ~~striking out~~
4. \hl: highlight

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References

[1] dummy citation

Table 3: Functions

\sin	\sinh	\arcsin	\asin	sin	sinh	arcsin	asin
\cos	\cosh	\arccos	\acos	cos	cosh	arccos	acos
\tan	\tanh	\arctan	\atan	tan	tanh	arctan	atan
\csc	\csch	\arccsc	\acsc	csc	csch	arccsc	acsc
\sec	\sech	\arcsec	\asec	sec	sech	arcsec	asec
\cot	\coth	\arccot	\acot	cot	coth	arccot	acot
\log	\ln			log	ln		

Table 4: Limits

\max	\min	\lim	max	min	lim
\sup	\inf	\argmin	sup	inf	$\arg\min$
\argmax			$\arg\max$		

Table 5: Function as text

\exp	\det	\Pr	exp	det	Pr
\tr	\Tr	\Res	tr	Tr	Res

Table 6: Conditional

\ave[a]{b}{c}	\prob{a}{b}	$\mathop{\mathbb{E}}_{a}\{b\|c\}$	$\mathbb{P}[a\|b]$
\entro{a}{b}	\KLdiv{a}{b}	$\mathrm{S}[a\|b]$	$\mathcal{D}(a\|\|b)$

\rank	\erf	\ker	rank	erf	ker
\deg	\gcd	\hom	deg	gcd	hom

Table 7: Symbols

\ell	\binary	\complex	\integer	ℓ	$\mathbb{B}$	$\mathbb{C}$	$\mathbb{Z}$
\real	\natural	\hilb		$\mathbb{R}$	$\mathbb{N}$	$\mathcal{H}$	