

# The **natex** package

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## Abstract

A collection of commands focused on consistent notation for engineering and physics applications. The repository for this package can be found at: <https://github.com/amilkyboi/natex>.

## Contents

<b>1</b>	<b>Included Packages</b>	<b>2</b>
<b>2</b>	<b>Commands</b>	<b>3</b>
2.1	Automated Bracing . . . . .	3
2.2	Vector Notation . . . . .	3
2.3	Dirac Notation . . . . .	3
2.4	Matrix Notation . . . . .	4
2.5	Conjugates . . . . .	4
2.6	Linear Operators . . . . .	4
2.7	Probability . . . . .	4
2.8	Other . . . . .	5
2.9	Constants . . . . .	5

## 1 Included Packages

This package requires and includes the `amssymb`, `bm`, `braket`, `mathtools`, and `physics2` packages. Only the `ab` module is loaded for `physics2`.

## 2 Commands

### 2.1 Automated Bracing

Command	Usage	Output	Definition
<code>\abs</code>	<code>\abs{x}</code>	$ x $	absolute value
<code>\norm</code>	<code>\norm{x}</code>	$\ x\ $	norm
<code>\eval</code>	<code>\eval{x}{a}{b}</code>	$x _a^b$	evaluation limits
<code>\order</code>	<code>\order{x^2}</code>	$\mathcal{O}(x^2)$	order of magnitude
<code>\comm</code>	<code>\comm{x}{y}</code>	$[x, y]$	commutator
<code>\acomm</code>	<code>\acomm{x}{y}</code>	$\{x, y\}$	anticommutator
<code>\pb</code>	<code>\pb{x}{y}</code>	$\{x, y\}$	Poisson bracket

### 2.2 Vector Notation

Command	Usage	Output	Definition
<code>\vb</code>	<code>\vb{x}</code>	$\boldsymbol{x}$	bold vector
<code>\vu</code>	<code>\vu{x}</code>	$\hat{\boldsymbol{x}}$	unit vector
<code>\vdot</code>	<code>\vb{x} \vdot \vb{y}</code>	$\boldsymbol{x} \cdot \boldsymbol{y}$	dot product
<code>\vcrs</code>	<code>\vb{x} \vcrs \vb{y}</code>	$\boldsymbol{x} \times \boldsymbol{y}$	cross product
<code>\grad</code>	<code>\grad{x}</code>	$\nabla x$	gradient
<code>\divr</code>	<code>\divr{\vb{x}}</code>	$\nabla \cdot \boldsymbol{x}$	divergence
<code>\curl</code>	<code>\curl{\vb{x}}</code>	$\nabla \times \boldsymbol{x}$	curl
<code>\slap</code>	<code>\slap{x}</code>	$\nabla^2 x$	scalar Laplacian
<code>\vlap</code>	<code>\vlap{\vb{x}}</code>	$\nabla^2 \boldsymbol{x}$	vector Laplacian
<code>\dalem</code>	<code>\dalem</code>	$\square$	d'Alembertian
<code>\del</code>	<code>\del</code>	$\nabla$	del

### 2.3 Dirac Notation

Command	Usage	Output	Definition
<code>\ev</code>	<code>\ev{x}</code>	$\langle x \rangle$	expectation value
<code>\ip</code>	<code>\ip{x}{y}</code>	$\langle x y \rangle$	inner product
<code>\op</code>	<code>\op{x}{y}</code>	$ x\rangle \langle y $	outer product

## 2.4 Matrix Notation

Command	Usage	Output	Definition
<code>\pmx</code>	<code>\pmx{1 &amp; 2 \\\ 3 &amp; 4}</code>	$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$	parenthetical matrix
<code>\bm{x}</code>	<code>\bm{x}{1 &amp; 2 \\\ 3 &amp; 4}</code>	$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$	bracketed matrix
<code>\vm{x}</code>	<code>\vm{x}{1 &amp; 2 \\\ 3 &amp; 4}</code>	$\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$	vertical matrix
<code>\cm{x}</code>	<code>\cm{x}{1 &amp; 2 \\\ 3 &amp; 4}</code>	$\left\{ \begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix} \right\}$	curly matrix
<code>\tp</code>	<code>\pmx{1 &amp; 2 \\\ 3 &amp; 4} \tp</code>	$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}^T$	transpose
<code>\tr</code>	<code>\tr \pmx{1 &amp; 2 \\\ 3 &amp; 4}</code>	$\text{tr} \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$	trace

## 2.5 Conjugates

Command	Usage	Output	Definition
<code>\cc</code>	<code>\cc{x}</code>	$x^*$	complex conjugate
<code>\hc</code>	<code>\hc{x}</code>	$x^\dagger$	Hermitian conjugate

## 2.6 Linear Operators

Command	Usage	Output	Definition
<code>\sop</code>	<code>\sop{x}</code>	$\hat{x}$	scalar operator
<code>\vop</code>	<code>\vop{x}</code>	$\hat{\boldsymbol{x}}$	vector operator

## 2.7 Probability

Command	Usage	Output	Definition
<code>\erf</code>	<code>\erf</code>	$\text{erf}$	error function
<code>\erfc</code>	<code>\erfc</code>	$\text{erfc}$	complementary error function

## 2.8 Other

Command	Usage	Output	Definition
<code>\Re</code>	<code>\Re</code>	Re	real part
<code>\Im</code>	<code>\Im</code>	Im	imaginary part
<code>\defn</code>	<code>\defn</code>	$\coloneqq$	defined as
<code>\_</code>	<code>x\_{\text}</code>	$x_{\text{text}}$	upright subscript

## 2.9 Constants

Command	Usage	Output	Definition
<code>\img</code>	<code>\img</code>	$i$	imaginary unit
<code>\eul</code>	<code>\eul</code>	$e$	Euler's number