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

1 Included Packages

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

2 Commands

2.1 Automated Bracing

Command	Usage	Output	Definition
\abs	\abs{x}	$\lvert x \rvert$	absolute value
\norm	\norm{x}	$\lVert x \rVert$	norm
\eval	\eval{x}{a}{b}	$x\vert_a^b$	evaluation limits
\order	\order{x^2}	$\mathcal{O}(x^2)$	order of magnitude
\comm	\comm{x}{y}	$[x,y]$	commutator
\acomm	\acomm{x}{y}	$\{x,y\}$	anticommutator
\pb	\pb{x}{y}	$\{x,y\}$	Poisson bracket

2.2 Vector Notation

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

2.3   Dirac Notation

Command	Usage	Output	Definition
\bra	\bra{x}	$\langle x\rvert$	bra
\ket	\ket{x}	$\lvert x\rangle$	ket
\ev	\ev{x}	$\langle x\rangle$	expectation value
\ip	\ip{x}{y}	$\langle x\rvert y\rangle$	inner product
\op	\op{x}{y}	$\lvert x\rangle\langle y\rvert$	outer product
\mel	\mel{x}{y}{z}	$\langle x\rvert y\rvert z\rangle$	matrix element

2.4   Set Notation

Command	Usage	Output	Definition
\naturals	\naturals	$\mathbb{N}$	set of natural numbers
\integers	\integers	$\mathbb{Z}$	set of integers
\rationals	\rationals	$\mathbb{Q}$	set of rational numbers
\reals	\reals	$\mathbb{R}$	set of real numbers
\complexes	\complexes	$\mathbb{C}$	set of complex numbers
\set	\set{a | b, c}	$\{a \mid b, c\}$	set builder notation

2.5 Matrix Notation

Command	Usage	Output	Definition
\pmx	\pmx{1 & 2 \\ 3 & 4}	$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$	parenthetical matrix
\bmx	\bmx{1 & 2 \\ 3 & 4}	$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$	bracketed matrix
\vmx	\vmx{1 & 2 \\ 3 & 4}	$\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$	vertical matrix
\cmx	\cmx{1 & 2 \\ 3 & 4}	$\begin{Bmatrix} 1 & 2 \\ 3 & 4 \end{Bmatrix}$	curly matrix
\tr	\tr \pmx{1 & 2 \\ 3 & 4}	$\mathrm{tr}\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$	trace
\tp	\tp{A}	A^{T}	transpose
\cc	\cc{A}	A^{*}	complex conjugate
\hc	\hc{A}	$A^{\dagger}$	Hermitian conjugate

2.6 Linear Operators

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

2.7 Probability

Command	Usage	Output	Definition
\erf	\erf	erf	error function
\erfc	\erfc	erfc	complementary error function

2.8 Trigonometric Functions

Command	Usage	Output	Definition
\asin	\asin{x}	$\operatorname{asin} x$	arcsine
\acos	\acos{x}	$\operatorname{acos} x$	arccosine
\atan	\atan{x}	$\operatorname{atan} x$	arctangent
\asec	\asec{x}	$\operatorname{asec} x$	arcsecant
\arcsec	\arcsec{x}	$\operatorname{arcsec} x$	arcsecant
\acsc	\acsc{x}	$\operatorname{acsc} x$	arccosecant
\arccsc	\arccsc{x}	$\operatorname{arccsc} x$	arccosecant
\acot	\acot{x}	$\operatorname{acot} x$	arccotangent
\arccot	\arccot{x}	$\operatorname{arccot} x$	arccotangent
\sech	\sech{x}	$\operatorname{sech} x$	hyperbolic secant
\csch	\csch{x}	$\operatorname{csch} x$	hyperbolic cosecant

2.9 Other

Command	Usage	Output	Definition
\Re	\Re	Re	real part
\Im	\Im	Im	imaginary part
\defn	\defn	$:=$	defined as
\subtxt	x\subtxt{text}	x_{text}	upright subscript
\suptxt	x\suptxt{text}	x^{text}	upright superscript

2.10 Constants

Command	Usage	Output	Definition
\img	\img	i	imaginary unit
\eul	\eul	e	Euler's number