Math-Symbols-in-LaTeX-Manual

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Add `\usepackage{math-symbols}` in your document's preamble.
And you will no longer need use other math package in most instances.

1 Constants and Useful Symbols

i	\mi	$\mathbb{N}$	\mnatr	$\mathbb{C}$	\mcmpx	$C[a,b]$	\mscab	$L^m([a,b])$	\mslbg[{[a, b]}]{m}
j	\mj	$\mathbb{Z}$	\mintg	$\mathbb{H}$	\mhilb	$C(I)$	\mscon{(I)}	$H^m([a,b])$	\mssbl[{[a, b]}]{m}
e	\me	$\mathbb{Q}$	\mrato	Cond.	\mcond	$L^2(I)$	\mslbg{2}		
1°	1\mdeg	$\mathbb{R}$	\mreal	const	\mconst	$H^2(I)$	\mssbl{2}		

2 Vector and Matrix Defination

2.1 Vector Notations

Use `\mv<name>` as the abbr of "Math Vector".

$\boldsymbol{a}$	\mva	$\boldsymbol{k}$	\mvk	$\boldsymbol{u}$	\mvu	$\boldsymbol{\alpha}$	\mvalpha	$\boldsymbol{\lambda}$	\mvlambda	$\boldsymbol{\chi}$	\mvchi
$\boldsymbol{b}$	\mvb	$\boldsymbol{l}$	\mvl	$\boldsymbol{v}$	\mvv	$\boldsymbol{\beta}$	\mvbeta	$\boldsymbol{\mu}$	\mvmu	$\boldsymbol{\psi}$	\mvpsi
$\boldsymbol{c}$	\mvc	$\boldsymbol{m}$	\mvm	$\boldsymbol{w}$	\mvw	$\boldsymbol{\gamma}$	\mvgamma	$\boldsymbol{\nu}$	\mvnu	$\boldsymbol{\omega}$	\mvomega
$\boldsymbol{d}$	\mvd	$\boldsymbol{n}$	\mvn	$\boldsymbol{x}$	\mvx	$\boldsymbol{\delta}$	\mvdelta	$\boldsymbol{\xi}$	\mvxi	$\boldsymbol{\varepsilon}$	\mvvarepsilon
$\boldsymbol{e}$	\mve	$\boldsymbol{o}$	\mvo	$\boldsymbol{y}$	\mvy	$\boldsymbol{\epsilon}$	\mvepsilon	$\boldsymbol{\pi}$	\mvpi	$\boldsymbol{\varkappa}$	\mvvarkappa
$\boldsymbol{f}$	\mvf	$\boldsymbol{p}$	\mvp	$\boldsymbol{z}$	\mvz	$\boldsymbol{\zeta}$	\mvzeta	$\boldsymbol{\rho}$	\mvrho	$\boldsymbol{\varphi}$	\mvvarphi
$\boldsymbol{g}$	\mvg	$\boldsymbol{q}$	\mvq			$\boldsymbol{\eta}$	\mveta	$\boldsymbol{\sigma}$	\mvsigma	$\boldsymbol{\varpi}$	\mvvarpi
$\boldsymbol{h}$	\mvh	$\boldsymbol{r}$	\mvr			$\boldsymbol{\theta}$	\mvtheta	$\boldsymbol{\tau}$	\mvtau	$\boldsymbol{\varrho}$	\mvvarrho
$\boldsymbol{i}$	\mvi	$\boldsymbol{s}$	\mvs			$\boldsymbol{\iota}$	\mviota	$\boldsymbol{\upsilon}$	\mvupsilon	$\boldsymbol{\vartheta}$	\mvvartheta
$\boldsymbol{j}$	\mvj	$\boldsymbol{t}$	\mvt			$\boldsymbol{\kappa}$	\mvkappa	$\boldsymbol{\phi}$	\mvphi		

2.2 Matrix/Tensor Notations

Use `\mm<name>` or `\mt<name>` as the abbr of "Math Matrix/Tensor".

$\mathbf{A}$	\mma	$\mathbf{G}$	\mmg	$\mathbf{M}$	\mmm	$\mathbf{S}$	\mms	$\mathbf{Y}$	\mmy	$\mathbf{\Gamma}$	\mmgamma	$\mathbf{\Sigma}$	\mmsigma
$\mathbf{B}$	\mmb	$\mathbf{H}$	\mmh	$\mathbf{N}$	\mmn	$\mathbf{T}$	\mmt	$\mathbf{Z}$	\mmz	$\mathbf{\Delta}$	\mmdelta	$\mathbf{\Upsilon}$	\mmupsilon
$\mathbf{C}$	\mmc	$\mathbf{I}$	\mmi	$\mathbf{O}$	\mmo	$\mathbf{U}$	\mmu			$\mathbf{\Theta}$	\mmtheta	$\mathbf{\Phi}$	\mmphi
$\mathbf{D}$	\mmd	$\mathbf{J}$	\mmj	$\mathbf{P}$	\mmp	$\mathbf{V}$	\mmv			$\mathbf{\Lambda}$	\mmlambda	$\mathbf{\Psi}$	\mmpsi
$\mathbf{E}$	\mme	$\mathbf{K}$	\mmk	$\mathbf{Q}$	\mmq	$\mathbf{W}$	\mmw			$\mathbf{\Xi}$	\mmxi	$\mathbf{\Omega}$	\mmomega
$\mathbf{F}$	\mmf	$\mathbf{L}$	\mml	$\mathbf{R}$	\mmr	$\mathbf{X}$	\mmx			$\mathbf{\Pi}$	\mmpi		

2.3 Transposed Matrix Notations

Use `\mm<name>t` as the abbr of "Math Matrix Transposed".

$\mathbf{A}^{\mathrm{T}}$	\mmat	$\mathbf{H}^{\mathrm{T}}$	\mmht	$\mathbf{O}^{\mathrm{T}}$	\mmot	$\mathbf{V}^{\mathrm{T}}$	\mmvt	$\mathbf{\Gamma}^{\mathrm{T}}$	\mmgammat	$\mathbf{\Upsilon}^{\mathrm{T}}$	\mmupsilont
$\mathbf{B}^{\mathrm{T}}$	\mmbt	$\mathbf{I}^{\mathrm{T}}$	\mmit	$\mathbf{P}^{\mathrm{T}}$	\mmpt	$\mathbf{W}^{\mathrm{T}}$	\mmwt	$\mathbf{\Delta}^{\mathrm{T}}$	\mmdeltat	$\mathbf{\Phi}^{\mathrm{T}}$	\mmphit
$\mathbf{C}^{\mathrm{T}}$	\mmct	$\mathbf{J}^{\mathrm{T}}$	\mmjt	$\mathbf{Q}^{\mathrm{T}}$	\mmqt	$\mathbf{X}^{\mathrm{T}}$	\mmxt	$\mathbf{\Theta}^{\mathrm{T}}$	\mmthetat	$\mathbf{\Psi}^{\mathrm{T}}$	\mmpsit
$\mathbf{D}^{\mathrm{T}}$	\mmdt	$\mathbf{K}^{\mathrm{T}}$	\mmkt	$\mathbf{R}^{\mathrm{T}}$	\mmrt	$\mathbf{Y}^{\mathrm{T}}$	\mmyt	$\mathbf{\Lambda}^{\mathrm{T}}$	\mmlambdat	$\mathbf{\Omega}^{\mathrm{T}}$	\mmomegat
$\mathbf{E}^{\mathrm{T}}$	\mmet	$\mathbf{L}^{\mathrm{T}}$	\mmlt	$\mathbf{S}^{\mathrm{T}}$	\mmst	$\mathbf{Z}^{\mathrm{T}}$	\mmzt	$\mathbf{\Xi}^{\mathrm{T}}$	\mmxit		
$\mathbf{F}^{\mathrm{T}}$	\mmft	$\mathbf{M}^{\mathrm{T}}$	\mmmt	$\mathbf{T}^{\mathrm{T}}$	\mmtt			$\mathbf{\Pi}^{\mathrm{T}}$	\mmpit		
$\mathbf{G}^{\mathrm{T}}$	\mmgt	$\mathbf{N}^{\mathrm{T}}$	\mmnt	$\mathbf{U}^{\mathrm{T}}$	\mmut			$\mathbf{\Sigma}^{\mathrm{T}}$	\mmsigmat		

2.4 Special Vector and Matrix Notations

0	\mvzero	\mmzero	\mtzero
1	\mvone	\mmone	\mtone

3 Useful Functions and Operators

d	\diff	eig	\eig	mean	\mean	card	\card	dist	\dist
D	\Diff	tr	\tr	var	\var	argmin	\argmin	rot	\rot
E	\Expect	lcm	\lcm	corr	\corr	argmax	\argmax	curl	\curl
diag	\diag	rand	\rand	conv	\conv	argopt	\argopt	div	\divergence

4 Useful Aliases and Generators

- **Derivatives.** Command: \[d]frac(diff|partial)(s|{var1}){var2}. var1 and var2 is numerator and denominator, respectively. [d] is just like the \dfrac providing a display mode. (diff|partial) provides derivative or partial derivative. (s|{var1}) means that the numerator is skippable. For example,

Text	TEX	Text	TEX
$\frac{\mathrm{d}u}{\mathrm{d}x}$	\fracdiff{u}{x}	$\dfrac{\mathrm{d}u}{\mathrm{d}x}$	\dfracdiff{u}{x}
$\frac{\mathrm{d}^2u}{\mathrm{d}x^2}$	\fracdiff{^2u}{x^2}	$\dfrac{\mathrm{d}^2u}{\mathrm{d}x^2}$	\dfracdiff{^2u}{x^2}
$\frac{\mathrm{d}}{\mathrm{d}x}$	\fracdiffs{x}	$\dfrac{\mathrm{d}}{\mathrm{d}x}$	\dfracdiffs{x}
$\frac{\partial u}{\partial x}$	\fracpartial{u}{x}	$\dfrac{\partial u}{\partial x}$	\dfracpartial{u}{x}
$\frac{\partial^2u}{\partial x^2}$	\fracpartial{^2u}{x^2}	$\dfrac{\partial^2u}{\partial x^2}$	\dfracpartial{^2u}{x^2}
$\frac{\partial}{\partial x}$	\fracpartials{x}	$\dfrac{\partial}{\partial x}$	\dfracpartials{x}

- **Function vaules at exact point.** Command: \mfwhen{var1}{var2}. var1 and var2 is function and point position, respectively. For example, \mfwhen{\fracpartial{u}{t}}{x=5} gets $\frac{\partial u}{\partial t}\big|_{x=5}$.
- **Auto sized brackets.** Command: \mclosure{} for (), \mclosuresquare{} for [], \mclosurebrace{} for {}. For example, $\mclosurebrace{\mclosuresquare{\mclosure{a^2+b^2}^2}^3}$.
- **Vector(Sequence) generator.** Command \mvct[z][t]{var1}{var2}. var1 and var2 is variable name and the last index, respectively. The index is begin from 1 in default. [z] makes index begins from 0. [t] makes this vector transposed into a column vector. For example,

Text	TEX	Text	TEX
$(a_1, a_2, \ldots, a_n)$	\mvct{a}{n}	$(a_0, a_1, \ldots, a_n)$	\mvctz{a}{n}
$(a_1, a_2, \ldots, a_n)^{\mathrm{T}}$	\mvctt{a}{n}	$(a_0, a_1, \ldots, a_n)^{\mathrm{T}}$	\mvctzt{a}{n}

- **A list of equations group by a brace.** Command \mequlist{...}. Also provide environment equlist, which is similar with the cases environment. For example, \mequlist{x + y &= 10 \\ 4x + 2y &= 30} gets $\mequlist{x + y &= 10 \\ 4x + 2y &= 30}$.