Math-Symbols-in-LATEX-Manual

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${\bf Contents}$

1	1 Constants and Useful Symbols															1				
	Vector and Matrix Defination2.1Vector Notations2.2Matrix Notations2.3Transposed Matrix Notations2.4Special vector and matrix notation														•	1 1 1 1				
3	Useful	Fun	ctions a	nd C	perato	rs														2
4	Useful	Alia	ases and	Gen	erators	3														2
1 Constants and Useful Symbols																				
i j e	\mij \mathbb{Z} \mintg \mathbb{H} \mhilb $C(I)$ \mathrm{Y} \median \mathrm{Q} \mathrm{W} \mathrm{C} \mathrm{C} \mathrm{O} \mathrm{C} \mathrm{O} \mathrm{C} \mathrm{O} \mathr						\msco	$\begin{array}{ll} \operatorname{Lm}([a,b]) & \operatorname{lm}[\{[a,b]\}] \\ \operatorname{lmscon}\{(\mathbf{I})\} & \operatorname{lm}([a,b]) & \operatorname{lmssbl}[\{[a,b]\}] \\ \operatorname{lmslbg}\{2\} \\ \operatorname{lmssbl}\{2\} & \end{array}$												
2	2 Vector and Matrix Defination																			
2.1	Vec	ctor	Notati	ions																
\boldsymbol{a}	\mva	$oldsymbol{j}$	\mvj	s	\mvs	α	\mvalpl	ha	κ	\mvka	арра	$oldsymbol{v}$	\mvup	psi	lon					
\boldsymbol{b}	\mvb	$oldsymbol{k}$	\mvk	$oldsymbol{t}$	\mvt	$oldsymbol{eta}$	\mvbeta	a	$oldsymbol{\lambda}$ \mvlambda $oldsymbol{q}$				\mvphi							
\boldsymbol{c}	\mvc	\boldsymbol{l}	\mv1	\boldsymbol{u}	\mvu	γ	\mvgamr		${m \mu}$	\mvmu χ \mvchi										
d	\mvd	m	\mvm	$oldsymbol{v}$	\mvv	$\boldsymbol{\delta}$	\mvdel		$\boldsymbol{\nu}$	\mvnu		$oldsymbol{\psi}$	\mvps							
e	\mve	\boldsymbol{n}	\mvn	$oldsymbol{w}$	\mvw	ϵ	\mveps:		•			ω	\mvor	meg	a					
f	\mvf	0	\mvo	\boldsymbol{x}	\mvx	ζ	\mvzeta	π	\mvpi											
$egin{array}{c} g \ h \end{array}$	\mvg \mvh	$egin{array}{c} oldsymbol{p} \ oldsymbol{q} \end{array}$	\mvp \mvq	$egin{array}{c} oldsymbol{y} \ oldsymbol{z} \end{array}$	\mvy \mvz	$egin{array}{c} oldsymbol{\eta} \ oldsymbol{ heta} \end{array}$	\mvtheta		$rac{ ho}{\sigma}$	\mvrho \mvsigma										
i	\mvi	r	\mvr	2	\III V Z	ι	\mviota		au	\mvta										
2.2	2 Ma	trix	Notat	ions	3															
\mathbf{A}	\mma	G	\mmg	\mathbf{M}	\mmm	\mathbf{S}	\mms	\mathbf{Y}	\mmy	$oldsymbol{\Gamma}$	\mmg	amma	$oldsymbol{\Sigma}$	\	mms	igma	1			
\mathbf{B}	\mmb	Н	_	\mathbf{N}	\mmn	${f T}$	\mmt	${f Z}$	\mmz		_	\mmdelta		\mmupsilon			1			
\mathbf{C}	\mmc		\mmi	Ο	\mmo	\mathbf{U}	\mmu			Θ \mmtheta		Φ	\	mmp	hi					
D	\mmd			\mathbf{P}	\mmp	\mathbf{V}	\mmv			Λ	\mml	ambda	Ψ	\	mmp	si				
${f E}$	\mme	K	\mmk	${f Q}$	\mmq	\mathbf{W}	\mmw			Ξ	\mmx	i	Ω	\	mmo	mega	1			
\mathbf{F}	\ mm-f	T.	\ mm 1	\mathbf{R}	\ mmr	\mathbf{x}	\ mmy			П	\ mmn	i								

2.3 Transposed Matrix Notations

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

2.4 Special vector and matrix notation

```
0 \mvzero 1 \mvone 0 \mmzero 1 \mmone
```

3 Useful Functions and Operators

```
d
    \diff
                 diag
                        \diag
                                  lcm
                                           \lcm
                                                    var
                                                            \var
                                                                      argmin
                                                                                 \argmin
                                                                                             card
                                                                                                     \card
D
    \Diff
                 eig
                        \eig
                                  rand
                                           \rand
                                                    corr
                                                            \corr
                                                                      argmax
                                                                                 \argmax
                                                                                             dist
                                                                                                     \dist
\mathbf{E}
                        \tr
    \Expect
                 \operatorname{tr}
                                  mean
                                           \mean
                                                                                 \argopt
                                                    conv
                                                            \conv
                                                                      argopt
```

4 Useful Aliases and Generators

- \fracdiff{}{}: frac & diff operator, also provide \dfracdiff{}{} mode. For example, \fracdiff{ u}{x} gets $\frac{du}{dx}$, \dfracdiff{^2u}{x^2} gets $\frac{d^2u}{dx^2}$
- \fracdiffs{}: special frac & diff operator. For example, \fracdiffs{x} gets $\frac{d}{dx}$, \dfracdiffs{y} gets $\frac{d}{dy}$
- \fracpartial{}{}: frac & partial operator, also provide \dfracpartial{}{} mode. For example, \fracpartial{u}{x} gets $\frac{\partial u}{\partial x}$, \dfracpartial{^2u}{x^2} gets $\frac{\partial^2 u}{\partial x^2}$
- \fracpartials{}: special frac & partial operator. For example, \fracpartials{x} gets $\frac{\partial}{\partial x}$, \delta dfracpartials{y} gets $\frac{\partial}{\partial y}$
- \mclosure{}, \mclosuresquare{}, \mclosurebrace{}: auto height brackets, eg $\left\{\left[\left(a^2+b^2\right)^2\right]^2\right\}$
- \mfwhen{}{}: create a symbol |, eg \mfwhen{\fracpartial{u}{t}}{x=5} gets $\frac{\partial u}{\partial t}\big|_{x=5}$
- \mvct{}{}, \mvctz{}{}: row vector creator, eg \mvct{a}{n} gets (a_1, a_2, \ldots, a_n) , \mvctz{a}{n} gets (a_0, a_1, \ldots, a_n)
- \mvctt{}{}, \mvctzt{}{}: column vector creator, eg \mvctt{a}{n} gets $(a_1, a_2, \dots, a_n)^T$, \mvctzt{a}{n} gets $(a_0, a_1, \dots, a_n)^T$
- \mequlist{}: provided a list of equations, eg \mequlist{x + y \&= 10 \\ 4x + 2y \&= 30} gets $\begin{cases} x+y=10 \\ 4x+2y=30 \end{cases}$, also provide environment equlist, which is similar with the cases environment