CONTENTS

${\it Math-Symbols-in-LAT}{\it EX-Manual}$

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1	Con	sta	nts aı	\mathbf{d}	Usefu	ıl S	ymbo	ols											
i j e	\mi \mj \me	\mj \mathbb{Z} \mintg \mathbb{H}				ncmpx hilb ncond	$C(I)$ $L^2(I)$) [)	\mslb	$\begin{array}{ll} Cab & L^m([a,b] \\ con\{(\mathtt{I})\} & H^m([a,b] \\ lbg\{\mathtt{2}\} \\ sbl\{\mathtt{2}\} \end{array}$				\mslbg[{[a, b] \mssbl[{[a, b]					
2 2.1			and I Notati		trix I	Defi	natio	n											
a	\mva	j	\mvj	s	\mvs	α	\mvalp	ha	κ	\mvka	anna	$oldsymbol{v}$	\mvu _l	nsi	i loı	n			
\boldsymbol{b}	\mvb	$\stackrel{J}{k}$	\mvk	$oldsymbol{t}$	\mvt	$\boldsymbol{\beta}$	\mvbet		λ		ambda	\mvpl	•						
c	\mvc	\boldsymbol{l}	\mvl	\boldsymbol{u}	\mvu	γ	\mvgam		μ	\mvmu		$\phi \ \chi$	\mvcl						
d	\mvd	m	\mvm	$oldsymbol{v}$	\mvv	$\dot{\delta}$	\mvdel		ν	\mvnu	J	$\check{oldsymbol{\psi}}$	\mvpsi						
e	\mve	\boldsymbol{n}	\mvn	\boldsymbol{w}	\mvw	ϵ	\mveps	ilor	n ξ	\mvxi ω			\mvomega						
f	\mvf	\boldsymbol{o}	\mvo	\boldsymbol{x}	\mvx	$\boldsymbol{\zeta}$	\mvzet	a	π	\mvp:	i								
\boldsymbol{g}	\mvg	$oldsymbol{p}$	\mvp	$oldsymbol{y}$	\mvy	η	\mveta		$oldsymbol{ ho}$	\mvrl	10								
h	\mvh	$oldsymbol{q}$	\mvq	\boldsymbol{z}	\mvz	$\boldsymbol{ heta}$	\mvtheta		σ	\mvsigma									
i	\mvi	r	\mvr			ι	\mviot	a	au	\mvta									
2.2	2 Ma	trix	Notat	ions	3														
\mathbf{A}	\mma	\mathbf{G}	\mmg	${f M}$	\mmm	\mathbf{S}	\mms	\mathbf{Y}	\mmy	Γ	\mmg	amma	$oldsymbol{\Sigma}$	١	\mm:	sigm	a		
\mathbf{B}	-	\mathbf{H}	\mmh	\mathbf{N}	\mmn	${f T}$	\mmt	${f Z}$	\mmz	Δ	\mmd	elta	Υ	١	\mm	upsi	10	n	
\mathbf{C}			\mmi	Ο	\mmo	\mathbf{U}	\mmu			Θ \mmtheta		Φ			phi				
D			\mmj	\mathbf{P}	\mmp	\mathbf{V}	\mmv			Λ		ambda				psi			
${f E}$	\mme		\mmk	${f Q}$	\mmq	\mathbf{W}	\mmw			Ξ	\mmx		Ω	١	\mm	omeg	a		
\mathbf{F}	\mmf	\mathbf{L}	$\mbox{mm1}$	${f R}$	\mmr	\mathbf{X}	\mmx			Π	\mmp	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{W}^T
                           \mathbf{I}^T
\mathbf{B}^T
           \mmbt
                                       \mmit
                                                       \mathbf{P}^T
                                                                   \mmpt
                                                                                                \mmwt
                                                                                                                           \mmdeltat
                                                                                                                                                                  \mmphit
                           \mathbf{J}^T
                                                                                                               \mathbf{\Theta}^T
\mathbf{C}^T
                                                       \mathbf{Q}^T
                                                                                  \mathbf{X}^T
           \mmct
                                       \mmjt
                                                                   \mmqt
                                                                                                \mmxt
                                                                                                                           \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{\Xi}^T
\mathbf{E}^T
                           \mathbf{L}^T
                                                       \mathbf{S}^T
                                                                                  \mathbf{Z}^T
           \mmet
                                        \mmlt
                                                                   \mmst
                                                                                                \mmzt
                                                                                                                           \mmxit
\mathbf{F}^T
                                                       \mathbf{T}^T
                                                                                                               \mathbf{\Pi}^T
                           \mathbf{M}^T
           \mmft
                                                                                                                           \mmpit
                                       \mmmt
                                                                   \mmtt
\mathbf{G}^T
                           \mathbf{N}^T
                                                                                                               \mathbf{\Sigma}^T
                                                       \mathbf{U}^T
           \mmgt
                                       \mmnt
                                                                   \mmut
                                                                                                                           \mmsigmat
```

2.4 Tensor Notations

```
Α
           В
               \mtb
                      C
                           \mtc
                                       \mtd
                                              Ε
                                                  \mte
                                                         F
                                                              \mtf
                                                                          \mtg
Η
               \mti
                                  Κ
                                       \mtk
                                              L
    \mth
           ı
                      J
                           \mtj
                                                  \mtl
                                                         Μ
                                                              \mtm
                                                                          \mtn
0
    \mto
           Ρ
               \mtp
                      Q
                           \mtq
                                  R
                                       \mtr
                                              S
                                                  \mts
                                                         Τ
                                                              \mtt
                                              Υ
                                                         Ζ
U
    \mtu
                \mtv
                           \mtw
                                  Χ
                                       \mtx
                                                  \mty
                                                              \mtz
```

2.5 Special Vector and Matrix Notations

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

3 Useful Functions and Operators

```
d
    \diff
               diag
                      \diag
                                                                           \argmin
                               lcm
                                        \lcm
                                                        \var
                                                                 argmin
                                                                                      card
                                                                                             \card
D
    \Diff
                                                                                             \dist
               eig
                       \eig
                               rand
                                        \rand
                                                        \corr
                                                                           \argmax
                                                                                      dist
                                                corr
                                                                argmax
\mathbf{E}
    \Expect
                       \tr
                               mean
                                        \mean
                                                conv
                                                        \conv
                                                                argopt
                                                                           \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 $(a_1, a_2, ..., a_n)$, \mvctz{a}{n} gets $(a_0, a_1, ..., a_n)$
- \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