575 Table of Symbols

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Symbol	Meaning	
$a, b, c, \alpha, \beta, \gamma$	Scalars are lowercase	
$\boldsymbol{x}, \boldsymbol{y}, \boldsymbol{z}$	Vectors are bold lowercase	
$\boldsymbol{A}, \boldsymbol{B}, \boldsymbol{C}$	Matrices are bold uppercase	
$\boldsymbol{x}^\top, \boldsymbol{A}^\top$	Transpose of a vector or matrix	
$\boldsymbol{A}^{-1}$	Inverse of a matrix	
$\langle \boldsymbol{x}, \boldsymbol{y} \rangle$	Inner product of $\boldsymbol{x}$ and $\boldsymbol{y}$	
$\boldsymbol{x}^\top \boldsymbol{y}$	Dot product of $\boldsymbol{x}$ and $\boldsymbol{y}$	
$[\boldsymbol{x}, \boldsymbol{y}, \boldsymbol{z}]$	Matrix of column vectors stacked horizontally	
$(\boldsymbol{x}, \boldsymbol{y}, \boldsymbol{z})$	(Ordered) tuple	
$\mathbb{R}^n$	n-dimensional vector space of real numbers	
$a := b$	a is defined as b	
$a =: b$	b is defined as a	
$a \propto b$	a is proportional to b, i.e., $a = \text{const.} \cdot b$	
$g \circ f$	Function composition; "g after f"	
$\mathfrak{L}$	Lagrangian	
$\mathcal{L}$	Negative log-likelihood	
$\dim$	Dimensionality of vector space	
$\mathrm{rk}(\boldsymbol{A})$	Rank of matrix $\boldsymbol{A}$	
$\mathrm{Im}(\Phi)$	Image of linear mapping Φ	
$\ker(\Phi)$	Kernel (null space) of a linear mapping Φ	
$\mathrm{span}[\boldsymbol{b}_1]$	Span (generating set) of $\boldsymbol{b}_1$	
$\det(\boldsymbol{A})$	determinant of $\boldsymbol{A}$	577
$\mathrm{tr}(\boldsymbol{A})$	trace of $\boldsymbol{A}$	
$\lvert \cdot \rvert$	Absolute value	
$\lVert \cdot \rVert$	Norm; Euclidean unless specified	
$\mathcal{A}, \mathcal{C}$	Sets	
$\mathcal{B}$	Basis set	
$\emptyset$	Empty set	
λ	Eigenvalue	
E_λ	Eigenspace of eigenvalue λ	
$\boldsymbol{e}_i$	Standard/canonical vector (where i is the component that is 1)	
D	Number of dimensions; indexed by $d = 1, \dots, D$	
N	Number of data points; indexed by $n = 1, \dots, N$	
$\boldsymbol{\theta}$	Parameter vector	
$\boldsymbol{I}_m$	identity matrix of size $m \times m$	
$\boldsymbol{0}_{m,n}$	matrix of zeros of size $m \times n$	
$\boldsymbol{1}_{m,n}$	matrix of ones of size $m \times n$	
$\mathbb{V}[\cdot]$	Variance of argument	
$\mathbb{E}[\cdot]$	Expectation of argument	
$\mathrm{Cov}[\cdot]$	Covariance of the argument	
$\mathcal{N}(\boldsymbol{\mu}, \boldsymbol{\Sigma})$	Gaussian distribution with mean $\boldsymbol{\mu}$ and covariance $\boldsymbol{\Sigma}$	
$\mathrm{Ber}(\mu)$	Bernoulli distribution with parameter μ	
$\mathrm{Bin}(N, \mu)$	Binomial distribution with parameters μ, N	
$x \sim p(\theta)$	Random variable x is distributed according to $p(\theta)$	

Table of Acronyms

Acronym	Meaning	Comments
$\iff$	if and only if	
$\implies$	implies	
$a := f(x)$	a is defined as $f(x)$	
$\frac{\partial f}{\partial x}$	Partial derivative of f with respect to x	
$\frac{\mathrm{d}f}{\mathrm{d}x}$	Total derivative of f with respect to x	
MLE	Maximum Likelihood Estimation	
PCA	Principal Component Analysis	
PPCA	Probabilistic Principal Component Analysis	
SVM	Support Vector Machines	