Lecture Notes: Notational Conventions

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April 18, 2011

1 Notation

$\{A, B, C\}$	set of elements
(A, B, C)	(ordered) tuple of elements
$x_{i:j} \equiv (x_i, x_{i+1}, .., x_j)$	tuple of elements with index from i to j
$x_{\{A,B,C\}} \equiv \{x_A, x_B, x_C\}$	set of selements
$\{i \ : \ g(i) = k\}$	the set of all i for which $g(i) = k$
$\sum_{i:g(i)=k} \cdots$	sum over all i for which $g(i) = k$
$\{x_i\}_{i=1}^N$	the set $\{x_1, x_2, .., x_N\}$
$x = (x_1, x_2, .., x_n)^\top \in \mathbb{R}^n$	n-dim vector – column vector of coordinates (contra-variant)
$x^\top$	transpose of x
$X \in \mathbb{R}^{n \times m}$	$n \times m$-matrix – first index: row, second index: column (first index is contra-variant, second index co-variant)
$\mathbf{1}_n$	n-dim vector of 1s, $(1, 1, .., 1)^\top$
$\mathbf{0}_n$	n-dim vector of 0s, $(0, 0, .., 0)^\top$
$\mathbf{I}_n$	$n \times n$ identity matrix
$x = \sum_i x_i \boldsymbol{e}_i \in V$	vector in vector space V with coordinates x_i in the basis vectors $\boldsymbol{e}_i \in V$
$X = \sum_{ij} X_{ij} \ \boldsymbol{e}_i \ d\boldsymbol{e}_j$	vector-valued one-form (in exterior calculus notation)
$\langle x \rangle$	lazy notation: the average of x (context should be clear)
$\langle f(x) \rangle_{p(x)} = \sum_x p(x) \ f(x)$	the expectation of $f(x)$ w.r.t. p(x)
$\|x\|_p = [\sum_{i=1}^n x_i^p]^{1/p}$	p-norm
$\|x\|_1$, $\|x\|_2$, $\|x\|_\infty$	L_1, L_2 and $\max$ norm
$\|x\|^2 = x^\top x = (\|x\|_2)^2$	sum of squares
$(x)_+$	zero for $x < 0$, x otherwise
$I(\text{expr.}) \in \{0, 1\}$	indicator function for a boolean expression