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Symbols and Notation

This index is intended to aid cross-referencing, so notation that is specific to a single chapter is generally not listed. Some symbols are used locally, without ambiguity, in senses other than those given below; numbers following an entry are page numbers.

Unless otherwise stated, functions are real-valued and binary operations between functions such as $f \pm g$, $f \cdot g$, $f \wedge g$, $f \vee g$, comparisons $f \leqslant g$, $f < g$ or limiting relations $f_n \xrightarrow{n\to\infty} f$, $\lim_n f_n$, $\liminf_n f_n$, $\limsup_n f_n$, $\sup_n f_n$ or $\inf_n f_n$ are understood pointwise.

General notation: analysis

positive	always in the sense $\geqslant 0$
negative	always in the sense $\leqslant 0$
$\mathbb{N}$	$1, 2, 3, \dots$
$\inf \emptyset$	$\inf \emptyset = +\infty$
$a \vee b$	maximum of a and b
$a \wedge b$	minimum of a and b
$\lfloor x \rfloor$	largest integer $n \leqslant x$
$\lvert x \rvert$	norm in $\mathbb{R}^d$: $\lvert x \rvert^2 = x_1^2 + \dots + x_d^2$
$x \cdot y$	scalar product in $\mathbb{R}^d$: $\sum_{j=1}^d x_j y_j$
$\mathbb{1}_A$	$\mathbb{1}_A(x) = \begin{cases} 1, & x \in A \\ 0, & x \notin A \end{cases}$
δ_x	point mass at x
$\mathcal{D}$	domain
Δ	Laplace operator
∂_j	partial derivative $\frac{\partial}{\partial x_j}$
∇, ∇_x	gradient $\left(\frac{\partial}{\partial x_1}, \dots, \frac{\partial}{\partial x_d}\right)^\top$
$\mathcal{F}f$, $\widehat{f}$	Fourier transform $(2\pi)^{-d} \int e^{-i\, x\cdot\xi} f(x)\, dx$
$\mathcal{F}^{-1}f$, $\check{f}$	inverse Fourier transform $\int e^{i\, x\cdot\xi} f(x)\, dx$
$e_\xi(x)$	$e^{-i\, x\cdot\xi}$

General notation: probability

$\sim$	'is distributed as'
$\perp$	'is stochastically independent'
a.s.	almost surely (w. r. t. $\mathbb{P}$)
iid	independent and identically distributed
$\mathsf{N}, \mathsf{Exp}, \mathsf{Poi}$	normal, exponential, Poisson distribution
$\mathbb{P}, \mathbb{E}$	probability, expectation
$\mathbb{V}, \mathbb{C}\mathrm{ov}$	variance, covariance
(L0)–(L3)	definition of a Lévy process, 7
(L2′)	13

Sets and σ-algebras

A^c	complement of the set A
$\overline{A}$	closure of the set A
$A \mathbin{\dot\cup} B$	disjoint union, i.e., $A \cup B$ for disjoint sets $A \cap B = \emptyset$
$B_r(x)$	open ball, centre x, radius r

$\operatorname{supp} f$	support, $\overline{\{f \neq 0\}}$
$\mathscr{B}(E)$	Borel sets of E
$\mathscr{F}_t^X$	canonical filtration $\sigma(X_s : s \leqslant t)$
$\mathscr{F}_\infty$	$\sigma\left(\bigcup_{t\geqslant 0} \mathscr{F}_t\right)$
$\mathscr{F}_\tau$	88
$\mathscr{F}_{\tau+}$	32
$\mathscr{P}$	predictable σ-algebra, 119

Stochastic processes

$\mathbb{P}^x, \mathbb{E}^x$	law and mean of a Markov process starting at x, 28
X_{t-}	left limit $\lim_{s\uparrow t} X_s$
ΔX_t	jump at time t: $X_t - X_{t-}$
σ, τ	stopping times: $\{\sigma \leqslant t\} \in \mathscr{F}_t$, $t \geqslant 0$
τ_r^x, τ_r	$\inf\{t > 0 : \lvert X_t - X_0\rvert \geqslant r\}$, first exit time from the open ball $B_r(x)$ centered at $x = X_0$
càdlàg	right continuous on $[0,\infty)$ with finite left limits on $(0,\infty)$

Spaces of functions

$\mathcal{B}(E)$	Borel functions on E
$\mathcal{B}_b(E)$	– –, bounded
$\mathcal{C}(E)$	continuous functions on E
$\mathcal{C}_b(E)$	– –, bounded
$\mathcal{C}_\infty(E)$	– –, $\lim_{\lvert x\rvert\to\infty} f(x) = 0$
$\mathcal{C}_c(E)$	– –, compact support
$\mathcal{C}^n(E)$	n times continuously diff'ble functions on E
$\mathcal{C}_b^n(E)$	– –, bounded (with all derivatives)
$\mathcal{C}_\infty^n(E)$	– –, 0 at infinity (with all derivatives)
$\mathcal{C}_c^n(E)$	– –, compact support
$L^p(E,\mu), L^p(\mu), L^p(E)$	L^p space w. r. t. the measure space $(E, \mathscr{A}, \mu)$
$\mathcal{S}(\mathbb{R}^d)$	rapidly decreasing smooth functions on $\mathbb{R}^d$, 41