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Abbreviations

Bold pagenumbers refer to this volume, non-bold pagenumbers to the other volume.

a.e.	almost everywhere	158, 385
ARCH	autoregressive conditional heteroscedasticity	39
a.s.	almost sure	8
BLIL	bounded law of the iterated logarithm	306
CLT	central limit theorem	85
ch.f.	characteristic function	400
CRI	communication resolution interval	38
CTM	Capetanakis–Tsybakov–Mikhailov	220
d.f.(s)	distribution function(s)	8, 107
dna	domain of normal attraction	306
DP	dual polyhedron	23
DTP	dual transportation problem	23
GARCH	general ARCH	39
htl	explained on page	433
IFS	iterated function systems	202
i.i.d.	independent identically distributed	35
KKR	Kakosjan, Klebanov, and Rachev	43
KRP	Kantorovich–Rubinstein transshipment problem	vii, 2
LCFS	last come first served	220
LHS	left-hand side	405
LLN	law of large numbers	81
lsc	lower semicontinuous	113

MKP	Monge–Kantorovich mass transportation problem	vii, 1, 19, 58
MKTP	classical Monge–Kantorovich transportation problem	374
MTPA	MTP with additional constraints	vii
MTP	mass transportation	vii, 1
MTPP	MTP with partial knowledge of the marginals	4
OTP	optimal transportation plan	3
PDE	partial differential equation	xii, xvi
PERT	network model	148
PP	primal polyhedron	23
r.f.(s)	random field(s)	248
r.v.(s)	random variable(s)	3
SDE	stochastic differential equation	39
SLLN	strong law of large numbers	30
supp P	support of P	20
TP	transportation problem	21
usc	upper semicontinuous	127

Symbols

Bold pagenumbers refer to this volume, non-bold pagenumbers to the other volume.

$\overset{\circ}{A}$	interior of A 59	$\text{Aut}(\mathbb{R}^d)$	all invertible linear operators (automorphisms) 151
$\bar{A} = \overline{A}^d$	closure of A with respect to d 68	$a(s, k)$	109
A_b	69	$a_{u_1}(x)$	296
A^b	69	$a(Z)$	superlinear mapping 241
A_k^d	set of all linear subspaces V_k of \mathbb{R}^d 137		
A_m	69	B	Banach limit 366
A^m	69	B^*	adjoint operator of B 132
A^ε	139	B_x	109
$A(h, g)$	assumption for a moment problem 62	$B(1, \frac{1}{n})$	Bernoulli distribution 257
$A_n(t)$	148	$B(g)$	assumption for the solution of a moment problem 62
$A_n^+(t)$	148	$B_K(S_i)$	61
$A^n(\alpha)$	190, 235	$B^n(\alpha)$	191
$A_n(\alpha)$	190, 235	$B_k^n(Z_k)$	191
$A_p(H)$	optimal multivariate transshipment costs 158	$B_n(m)$	set of nonnegative Borel measures 377
$A(\alpha)$	263		
$A\ r\hat{f}\ _{\overline{\mathcal{D}}}$	393		
$AS_p(P_1, P_2)$	97		
$A_*(\alpha)$	191, 235		

$B_p(H)$	upper bound for $A_p(H)$ 158	$C^\gamma(c; \sigma_1, \sigma_2)$	307
$B(p; x, y)$	quadratic form 280	$C(Q)$	set of continuous functions 384
B_r	ball of radius r 149	$\overset{\circ}{C}(Q)$	quotient of the space $C(Q)$ 384
$B(S_i)$	72	$\overset{\circ}{C}(Q)^*$	conjugate space 393
$B(X, \mathcal{B})$	58	$C_b(\mathbb{R}^d)$	set of all bounded continuous functions on \mathbb{R}^d 152
$B_1(x, y)$	28	$C(S)_+$	166
$B_2(x, y)$	28	$C(S)_+^*$	166
$B(\alpha)$	263	$C_m(\theta)$	170
$B_x(\varepsilon)$	109	Cov	covariance 108
$(B, \ \cdot\)$	separable Banach space $C(T)$ 248	$\text{Cov}(X_i \mathcal{F}_{i-1})$	conditional covariance 96
b	transshipment 371	\mathcal{c}	closure 304
b_r	absolute moments 102	$c(i, j)$	discrete cost 27, 29
$b_{u_1}(x)$	296	$c(x, y)$	cost function viii, 10
$\text{ba}(P_1, \dots, P_n)$	measures with fixed marginals 62	$c_1(x, y)$	$= \frac{\partial}{\partial x} c(x, y)$ 128
$\text{ba}(S, \mathcal{B})$	finitely additive measures 58	$c_*(x, y)$	reduced cost function 170
C, C^i	spaces of continuous and i times differentiable functions 255, 333	$\text{con}(\text{supp}(P))$	129
$C_{p,d}$	321	(D)	duality 76
$C_{s,z}$	integrable $(s-1)$ -fold derivative 115	$D(h, g)$	assumption for a moment problem 62
$C_{s,\varepsilon z}$	117	DP	dual polyhedron 23
$C(g)$	assumption for the solution of a moment problem 62	$D(P, Q)$	50
$C_b(S), C^b(S)$	Banach space of bounded continuous real-valued functions on S 63, 164	$D_p f(x)$	optimal pairs 103
$C(T)$	Banach space 248	$D\Phi$	$= (\frac{\partial \Phi_i}{\partial x_j})$ 118
		$D_k(\vartheta)$	112
		$D_m(\theta)$	170
		d_r	smoothed version of d 137
		$d_{r,k}$	61
		$d(h)$	divisor criterion 180
		$d_{n,m}(x, t)$	determinant of $A_{n,m}(x, t)$ 397
		$d(\bar{x}, \bar{y})$	76
		$d(X, Y)$	uniform metric 137

$\bar{d}_r(X, Y)$	probability metric 170	$F_1^*(x)$	12
$d_{KR}(\sigma_1, \sigma_2)$	Kantorovich–Rubinstein distance 162	$F_2^*(x)$	12
$d_n(\mu)$	267	$\tilde{F}(x, y)$	extended Fréchet bound 19
$\text{dom } f_k$	253	$F^P(x, y)$	26
$\text{dom } \Gamma$	235	$F^\sigma(x, y)$	19
E	separable metric space 278	$F_{N_s}^{(-1)}(y)$	310
$E_{k-1}(f; Q)$	factor-norm 384	\bar{f}	Young–Fenchel transform 104
$E(S_i)$	finite elementary functions on S_i 76	f^c	c -conjugate of f 124
$E_s(X, Y)$	set of points 425	f^{cc}	doubly c -conjugate of f 124
ess sup	essential supremum 386	$f^{(m)}$	m th Fréchet derivative of f 102
ex \mathcal{H}	extremal points of \mathcal{H} 19	$f^{(n)c}$	n th c -conjugate of f 124
F^*	Fréchet bound 19, 31, 33	f^*	p -conjugate 114, 124
F^P	distribution function of P 18	f^{**}	second p -conjugate 102, 112
F_i	real distribution function 107	$f^{(n)*}$	n -conjugate function of f 112
F_{m_n}	n th integral of m 375	f_*	lower conjugate 103
\bar{F}_{m_n}	survival function 375	$f_2(u)$	38
$F_n^{(n)}$	385	$f_a(x)$	145
$(F_{s,x})$	423, 107	$f(Z_1, Z_2)$	extension f 317
F_u	355	$f_V(\cdot)$	translation by V 95
$FM_p(P_1, P_2)$	Fortét–Mourier metric 17, 51	G_k	359
$F_i(s)$	293	G^Q	determination of an optimal measure Q 29
$F_1 \wedge F_2(t)$	infimal convolution 148	$G_{s,p}$	class of functions 103
$F_1 \vee F_2(t)$	supremal convolution 148	G_α	geometric α -stable r.v. 242
$F_+(x)$	$:= \min(F_i(x_i))$ 107	$ G 1 _\infty$	71
$F_-(x)$	$:= \left(\sum_{i=1}^k F_i(x_i) - (n-1) \right)_+$ 107	$G(m, \alpha, \beta)$	grid class 41
		$\bar{G}_{s,X}(t)$	424
		$G(u, v)$	graph of $(u, v) \in DP$ 23
		$G^\sigma(x, y)$	19

$G_n(Z)$	255	k_r	r th difference pseudomoment
$G(\mu)$	μ -negligible open set 221		122
$\bar{g} =$	$(g_1, \dots, g_N) \in \mathcal{M}$		
$\text{gr } \Gamma_n$	63	L	Lévy metric 81 , 109
$g(\chi)$	graph of Γ_n 194	L^∞	L^∞ -space of functions 388
	363	\bar{L}^∞	389
H	Haar probability	L_c	17
	133	L_f	continuous linear functional 401
H_ℓ	distribution function of $\max(V_1, \dots, V_\ell)$	\bar{L}_i	30
	156	L_n	class of n th integrals 47
$H_n^{(k)}$	258	\hat{L}_p	139
h_β	indicator or characteristic function 251	$(L1), (L2)$	309
		$L_{[-]c}(a, r, d)$	58
$h_\mu(A \times B)$	generalized upper Fréchet bound 54, 35	$L_{[-]}(a, r, d_1, d_r)$	60
		$L_{[-]c}(r, d)$	59
$h(t_1, t_2)$	Hausdorff metric 248	$L_{[-]}(r, d_1, d_r)$	61
		$L_f^1(P_i)$	69
		$LSC(\beta S_1 \times \beta S_2)$	252
		$L_p(X, Y)$	132, 72
I	175	$L_p(\tilde{X}, \tilde{Y})$	L_p -metric 76
I_q	unit matrix 334	$\hat{L}_{p,r}(X, Y)$	140
I_s	operator 415	$\tilde{L}_{p,r}(X, Y)$	probability metric 170
$I[A]$	indicator function of a set A 139	$\tilde{L}_{p,t}^*(X, Y)$	302
$I(f - g)$	semimetric on $\mathcal{P}(S)$ 67	$L_{p,t}^*(X, Y)$	280
		$L_r(\mu)$	r -fold integrable functions 32
$I(h)$	65		196
$I\{0, \bar{g}, \bar{a}, \bar{b}\}$	69	$L^p(\mu)$	Lagrange function 311
IND	$= \ell_p(X, \underline{X})$ 76	$L(\omega, \mu)$	bounded Lipschitz functions 88
$i(x_1, x_2)$	indicator metric 111	Lip $_b$	Lipschitz norm 49
		Lip $_h(r)$	r -Lipschitz functions 163
J_A	151	Lip (r, S)	Kantorovich metric 35, 86
			bounded real sequences $(\xi_T)_{T=1}^\infty$ 366
$K(d, B)$	137		92
$K_r(P, Q)$	Kantorovich-type metric 48, 412	ℓ_1	Kantorovich metric 35, 86
$K_1(P, Q)$	Kantorovich metric 412	ℓ^∞	bounded real sequences $(\xi_T)_{T=1}^\infty$ 366
$K(x, \cdot)$	Markov kernel 200	ℓ_1^*	92

$\ell_{p,t}^*(m_1, m_2)$	280	$m_\theta(n)$	142
$\ell_2(P^X, P^Y)$	$= \ell_2(X, Y)$ 132	m_n	375
$\ell_p(P_1, P_2)$	ℓ_p -metric 6, 87		
$\ell_p(X, Y)$	76	$N_{(m,\sigma)}$	normal distribution 188
$\ell_p(\mu, \nu)$	334	N_s	309
$\bar{\ell}_r(P_1, P_2)$	smoothed version of ℓ_1 (of order r) 35, 87	$n^{-1}S_{n,c}$	normalized rounding error 81
M_c	set of measures 403	$OTP(c)$	OTP with respect to c 3
M^i	pseudometrics 423		
M°, M_k°	linear space 384	$P_\ell^{(t)}$	marginal of P_ℓ in the direction t 46
$M_r (r > 0)$	set of measures 403	$P^{(X_u)_{u \leq s}}$	285
M_r^0	subset of M_r 403	$P^*(A \times B)$	35
M_s	Lévy measure 246	$P_{1,2}(B A)$	transportation plan 2
M_s°	set of all signed Borel measures μ on \mathbb{R}^n 47	$P^*(h)$	outer integral of h 65
M_μ	40	PP	primal polyhedron 23
$M_\mu(B)$	41	$P_\varepsilon X$	approximation 93
$M^1(C_T)$	280	$P(\mu)$	stochastic optimization problem 49
$M_p(C_T, m_0)$	280	$P \wedge \mu$	infimum in the lattice of measures 41
$M_1(c)$	59		
$M_2(c)$	60	p_N	180
$M_C(F, G)$	15	p_{m_n}	density of m_n 376
$M(h, \delta)$	81	(p, h)	vector problem 180
$M_X(n)$	142	$p_X(t)$	density of the r.v. X 419
$M_\theta(n)$	142		
$M^1(P_1, P_2)$	35	Q_d	set of d -quasi periodic points 355
$M(P_1, \dots, P_n)$	measures with marginals P_i 58	Q_γ	309
$M(\mathbb{R}^k), M$	finite signed Borel measures 375	$Q_{p,r}$	140
$M(S)$	319	$Q(a)$	256
$M_f(S), M_f(S \times S)$	finite measures 36		
$M_1(U)$	probability measures 191	$R_{p,r}$	140
M_μ	40	$R = R(k, n)$	405
$m(c)$	58	$R(Y)$	145
$m_0(c)$	59		
$m_X(n)$	142		

$R(x)$	$= \frac{x'Mx}{x'x}$ 137	T	transformation 192
$\text{rba}(S, \mathcal{R}(\mathcal{E}))$	regular bounded additive measures 63	T_r	138
S^1	unit circle 47	$TC(u, v)$	total costs 25
S^1	421	$T_p(t)$	quantile function 32
S^2	421	$T(\lambda)$	a weighted sum 126
S^{coll}	129	T^{\leftarrow}	253
S^{ind}	129	t^A	132
S_+^γ	313	U	dual operator 40
S_-^γ	313	U_C	17
S_n	80	U_0	415
S_n	simplex 181	$U_{[1]c}(a, r, d)$	57
S_n^*	sum of conventional roundings 80	$U_{[1]c}(r, d)$	58
$S_{n,c}$	total rounding error 81	$U_{[1]}(r, d_1, d_r)$	60
$S_{n,m}$	255	$\ U\ _{\mathcal{U}}$	norm 74
(S, \leq)	topological space with closed preorder \leq 44	$U_\mu(\varphi)$	transportation problem with local upper bound μ 40
$S_1 \oplus S_2$	316	$(U, \ \cdot\)$	separable Banach space 86
(S_i, \mathcal{B}_i)	measurable spaces 58	u_X, u_Y	densities 107
$S(c)$	58	$u_s^{(k)}$	285
$S_0(c)$	59	$u_{1n}(x), u_{2n}(x)$	263
(S, d)	(separable) metric space 92	V_i	rounding error 81
(SE)	333	V_ε	finite covering ε -net 93
$S(h)$	shift operator 65, 390	$V(S)$	219
$SL_r(P_1, P_2)$	Skorohod– Lebesgue metric 34	$V_+(S)$	219
$S_p(P)$	97	$V_0(S)$	220
$S_p^p(P_1, P_2)$	dual form of $S_p(P_1, P_2)$ 97	$\text{Val}(c; \sigma_1, \sigma_2, b)$	optimal value 252
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