

Full Index of Notations

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 A page number in *italics* (boldface or no) refers to the
 Answers in <http://www.ma.utexas.edu/users/cup/Answers>.

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\mathbb{C}	the complex plane	363

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$\mathfrak{C} = \mathfrak{C}[\mathcal{F}.]$	the continuous adapted processes	24
$\delta^{\eta\theta}$	the Kronecker delta	19
δ_s	the Dirac measure, or point mass, at s	398
ΔX	the jump process of $X \in \mathfrak{D}$ ($\Delta X_0 \stackrel{\text{def}}{=} 0$)	25
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$D^\lambda F[u]$	the λ^{th} (weak) derivative of F at u	305
\mathcal{D}_E^u	the Skorohod paths stopped at u	444
dF	the measure with distribution function F	406
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$\mathcal{D}^{(n)}$	the path space of the n^{th} random walk	426
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$\mathfrak{D} = \mathfrak{D}[\mathcal{F}.]$	the càdlàg adapted processes	24
$\text{dom}(f)$	the domain of f	363
\mathcal{D}^d	canonical path space	66
$\mathcal{D}, \mathcal{D}^d, \mathcal{D}_E$	canonical space of càdlàg paths	66
\mathbb{E}^x	$\mathbb{E}^x[F] = \int F d\mathbb{P}^x$	351
$\mathbb{E}, \mathbb{E}^{\mathbb{P}}$	expectation under the prevailing probability, \mathbb{P}	32
$\mathbb{E}[f \Phi], \mathbb{E}[f \mathcal{Y}]$	the conditional expectation of f given Φ, \mathcal{Y}	407
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\mathcal{E}_+^\uparrow	the pointwise suprema of sequences in \mathcal{E}	88
$\mathcal{E}^\sigma, (\mathcal{E}^d)^\sigma$	the sequential closure of $\mathcal{E}, \mathcal{E}^d$	392
\mathfrak{e}	the vector lattice of step functions on \mathbb{R}_+	44
\mathcal{E}_{00}	the \mathcal{E} -confined functions in \mathcal{E}	369
$\overline{\mathcal{E}}_{00}$	the confined uniform closure of \mathcal{E}_{00}	370
\mathcal{E}_{00}^σ	the \mathcal{E} -confined functions in \mathcal{E}^σ	393
\emptyset	the empty set	364
$\mathcal{E}^{\mathbb{P}} = \mathcal{E}[\mathcal{F}^{\mathbb{P}}]$	the elementary integrands of the natural enlargement	57
ϵ	denoting measurability, as in $f \in \mathcal{F}/\mathcal{G}$	391
ϵ	“is member of” or “is measurable on”	23
\doteq	denoting equality almost surely or of classes	32
$=$	denotes near equality and indistinguishability	35
${}^0\mathbf{F}$	coupling coefficients adjusted so that ${}^0\mathbf{F}[0] = 0$	272
${}^0\mathbf{C}$	initial condition adjusted correspondingly	272

\mathcal{F}_+	the positive elements of \mathcal{F}	363
\mathcal{F}_t	the past or history at time t	21
\mathcal{F}_T	the past at the stopping time T	28
\mathcal{F}_\cdot	the filtration $\{\mathcal{F}_t\}_{0 \leq t \leq \infty}$	21
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\mathcal{F}_+	the right-continuous version of \mathcal{F}_\cdot	37
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$\mathcal{F}_\cdot[Z]$	the natural filtration of the process Z	39
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$\mathcal{F}_+^0[\mathcal{D}_E]$	the canonical filtration of path space	66
$\mathcal{F}_\cdot[\mathcal{D}_E]$	the natural filtration of path space	67
\mathcal{F}_∞^*	universal completion of \mathcal{F}_∞	22
\mathcal{F}_δ	the intersections of countable subfamilies of \mathcal{F}	432
$\mathcal{F}_\infty, \mathcal{F}_\infty^*$	the σ -algebra $\bigvee_{0 \leq t < \infty} \mathcal{F}_t$, its universal completion	22
$\ \cdot\ _{E \rightarrow S}$	the operator norm $\sup\{\ Te\ _S : \ e\ _E \leq 1\}$	388
$[r]$	the largest integer n with $n \leq r$	79
$\hat{g} = \mathfrak{F}[g(x)], \mathfrak{F}^{-1}[\cdot]$	Fourier transform and inverse	410
\mathcal{F}_{T-}	the strict past of T	120
$\mathfrak{F}[\ \cdot\ ^*]$	the processes finite for $\ \cdot\ ^*$	97
\mathcal{F}_σ	the unions of countable subfamilies of \mathcal{F}	432
$\mathcal{F}_{\sigma\delta}$	the intersections of countable subfamilies of \mathcal{F}_σ	432
$\mathcal{F}_\cdot^{\mathbb{P}}, \mathcal{F}_\cdot^{\mathfrak{B}}$	the \mathbb{P}, \mathfrak{B} -regularization of \mathcal{F}_\cdot	37
$\mathcal{F}_\cdot^{\mathfrak{B}} = \widetilde{\mathcal{F}_\cdot}$	the (\mathfrak{B} -) regularization of \mathcal{F}_\cdot	38
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\mathcal{G}_δ	the intersections of countable subfamilies of \mathcal{G}	441
\mathcal{G}	the open sets of the topological space at hand	441
\mathcal{K}_σ	the unions of countable subfamilies of \mathcal{K}	441
\mathcal{K}	the compact sets of the topological space at hand	441
\widetilde{F}	a predictable envelope of F .	125
$\mathbf{F}[X]_-$	left-continuous version of coupling coefficient	271
$G_{\mathcal{A}}$	the graph of the operator \mathcal{A}	464
$\gamma^{(q)}$	the symmetric q -stable random variable	458
$\ \gamma^{(q)}\ _p$	$= \left(\int \gamma^{(q)}(x) ^p dx \right)^{1/p}$	458
$S^\Delta \stackrel{\text{def}}{=} S \dot{\cup} \{\Delta\}$	the one-point compactification of S	374
γ_t, γ_{tB}	the centered Gaussian with variance t, tB	419
$\widetilde{\mathbf{H}} \stackrel{\text{def}}{=} \mathbf{H} \times [0, \infty)$	the product of auxiliary space with time	177
h_0	prototypical sure Hunt function $\mathbf{y} \mapsto \mathbf{y} ^2 \wedge 1$	180
h'_0	$\mathbf{y} \mapsto \int_{\ \zeta\ \leq 1} e^{i\langle \zeta, \mathbf{y} \rangle} - 1 ^2 d\zeta$, another one	182

$\eta_{p,q}(\mathcal{I})$	a factorization constant	192
I	the identity operator or matrix	463
$\int \mathbf{X} d\mathbf{Z}$	the elementary integral for vectors	56
$\int X dZ$	the elementary integral	47
$\int_A F = \int A \cdot F$	the integral over the set A of the function F	105
$\int \mathbf{X} d\mathbf{Z}$	the (extended or Itô) integral for vectors	110
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$\int \mathbf{X} d\mathbf{Z}$	the (extended) stochastic integral for vectors	134
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$X \circ Z$	the indefinite Stratonovich integral	169
$\int_0^T G dZ$	$\int_0^T G dZ \stackrel{\text{def}}{=} \int G dZ^T$	131
$\int_{S^+} G dZ$	$\int_0^T G \cdot ((S, \infty)) dZ$	131
$J_{\mathbf{Z}}$	the jump measure of \mathbf{Z}	181
$H * J_{\mathbf{Z}}$	the indefinite integral of H against jump measure	181
$\mathcal{K}[Z]$	ingredient in $\ Z\ _{\mathcal{K}^q}$	209
L^∞	the essentially bounded measurable functions	448
$L^p = L^p(\mathbb{P})$	the space of $p; \mathbb{P}$ -integrable functions	33
$L^0, L^0(\mathcal{F}_t, \mathbb{P})$	(classes of) measurable a.s. finite functions	33
M_∞	the limit of the martingale M at infinity	75
$\ \cdot\ _p = \ \cdot\ _{\ell^p}$	$\ x\ _p \stackrel{\text{def}}{=} (\sum_\nu x^\nu ^p)^{1/p}, 0 < p < \infty$	364
$\ \cdot\ _\infty = \ \cdot\ _{\ell^\infty}$	$\ x\ _\infty \stackrel{\text{def}}{=} \sup_\nu x^\nu $	364
$\ \cdot\ $	any of the norms $\ \cdot\ _p$ on \mathbb{R}^n	364
$\langle \mathbf{x} \mathbf{y} \rangle$	the inner product of vectors \mathbf{x} and \mathbf{y}	238
$\ \cdot\ _{\infty p}$	$\ \mathbf{F}\ _{\infty p} \stackrel{\text{def}}{=} (\sum_\nu (\sup_\eta F_\eta^\nu)^p)^{1/p}$	283
ℓ^p	the vectors or sequences $x = (x^\nu)$ with $\ x\ _p < \infty$	364
$\ell^0 \stackrel{\text{def}}{=} \mathbb{R}^{\mathbb{N}}$	the Fréchet space of scalar sequences	364
\mathcal{L}	the left-continuous paths with finite right limits	24
$\mathfrak{L} = \mathfrak{L}[\mathcal{F}.]$	the collection of adapted maps $Z : \Omega \rightarrow \mathcal{L}$	24
$\mathfrak{L}^1[\llbracket \cdot \rrbracket^*] \& \mathfrak{L}^1[Z-p]$	the $\llbracket \cdot \rrbracket^*$ - & Z - p -integrable processes	99
$\mathfrak{L}^1[\zeta-p] = \mathfrak{L}^1[\llbracket \cdot \rrbracket_{\zeta-p}^*]$	the ζ - p -integrable processes	175
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$\mathfrak{M}^*(E) \& \mathfrak{M}^\cdot(E)$	the σ -additive & order-continuous measures on E	421
$\mathfrak{M}^*[\mathcal{E}]$	the σ -additive measures on \mathcal{E}	406
\vee	$\vee \mathcal{F} =$ supremum or span of the family \mathcal{F}	22

$\wedge \& \vee$	$a \vee b$ & $a \wedge b$: smaller & larger of a, b	364
\wedge	$a \wedge b$ is the minimum of a and b	14
$\mathfrak{M}(\cdot)(E)$	the order-continuous measures on $C_b(E)$	421
$\ \cdot \ _E$	the quasinorm on the quasinormed space E	381
$\ \cdot \ _{\mathcal{E}}$	the sup-norm on the space \mathcal{E} of functions	188
$\ \mathcal{I}\ = \ \mathcal{I}\ _{L(E,F)}$	$= \sup\{\ \mathcal{I}(x)\ _F : x \in E, \ x\ _E \leq 1\}$	381
$\ u\ = \ u\ _{L(E,F)}$	$= \sup\{\ u(x)\ _F : x \in E, \ x\ _E \leq 1\}$	381
$\text{mesh}(\mathcal{S})$	the mesh of a random partition	138
M^g	the martingale $M^g = \mathbb{E}[g \mathcal{F} \cdot]$	72
$\ Z\ _{\mathcal{K}^q}$	$= \inf\{\ g\ _{L^q} : g \in \mathcal{K}[Z]\}$	209
$\ \cdot \ _{BMO}$	$= \ \cdot \ _{\mathcal{K}^\infty}$	210
$\ f\ _p^* = \ f\ _{p;\mathbb{P}}^*$	its mean $\ f\ _{L^p(\mathbb{P})}^* \stackrel{\text{def}}{=} (\int^* f ^p d\mathbb{P})^{1/p}$	452
$\ f\ _p = \ f\ _{L^p(\mathbb{P})}$	$\stackrel{\text{def}}{=} (\int f ^p d\mathbb{P})^{1/p}$	33
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$\ \cdot \ _{Z-p}$	the semivariation for $\ \cdot \ _p$	53
$\ \cdot \ _{Z-p}^*$	the Daniell extension of $\ \cdot \ _{Z-p}$	88
$\ f\ _p^* = \ f\ _{p;\mathbb{P}}^*$	its mean $\ f\ _{L^p(\mathbb{P})}^* \stackrel{\text{def}}{=} (\int^* f ^p d\mathbb{P})^{1/p \wedge 1}$	452
$\ f\ _p = \ f\ _{L^p(\mathbb{P})}$	$= \ f\ _{L^p(\mathbb{P})} \stackrel{\text{def}}{=} (\int f ^p d\mathbb{P})^{1/p \wedge 1}$	33
$\ \cdot \ _*$	a subadditive mean	95
$\ \zeta^{h,t}\ _{\mathcal{I}^p} = \ \zeta^{h,t}\ _{\mathcal{I}^p[\mathbb{P}]}$	integrator (quasi)norms of the random measure ζ	173
$\ Z\ _{\mathcal{I}^p} = \ Z\ _{\mathcal{I}^p[\mathbb{P}]}$	integrator (quasi)norms of the integrator Z	55
$\ \cdot \ _{Z-p}^* = \ \cdot \ _{Z-p;\mathbb{P}}^*$	THE Daniell mean	88
$\underline{m}[f] = \underline{m}[f; \xi']$	local constant for a single-step method ξ'	281
$\ Z\ _{\mathcal{I}^p} = \ Z\ _{\mathcal{I}^p[\mathbb{P}]}$	$\stackrel{\text{def}}{=} \sup\{\ \int X dZ\ _{L^p(\mathbb{P})} : X \in \mathcal{E}, X \leq 1\}$	55
$\ Z\ _{\mathcal{I}^p} = \ Z\ _{\mathcal{I}^p[\mathbb{P}]}$	$\stackrel{\text{def}}{=} \sup\{\ \int \mathbf{X} d\mathbf{Z}\ _{L^p(\mathbb{P})} : \mathbf{X} \in \mathcal{E}, \mathbf{X} \leq 1\}$	56
$\ \cdot \ _{[\alpha]}^*$	the corresponding mean	452
$\ \cdot \ _{[\alpha]}$	$\ f\ _{[\alpha]} \stackrel{\text{def}}{=} \inf\{\lambda > 0 : \mathbb{P}[f > \lambda] \leq \alpha\}$	34
$\ \cdot \ _{Z-[\alpha]}$	the corresponding semivariation	53
$\ \cdot \ _{Z-[\alpha]}^*$	the Daniell extension of $\ \cdot \ _{Z-[\alpha]}$	88
$\ \cdot \ _{[\alpha]}$	the integrator size according to $\ \cdot \ _{[\alpha]}$	55
$\ \cdot \ _{p,M}, \ \cdot \ _{p,M}^*$	Picard Norms	283
μ_Z	the Doléans–Dade measure of Z	222
$\ f\ _0 = \ f\ _{0;\mathbb{P}}$	the metric $\inf\{\lambda : \mathbb{P}[f \geq \lambda] \leq \lambda\}$ on L^0	34
\mathcal{F}^μ	μ -completion of \mathcal{F}	414
$N(0, t)$	the law “normal zero- t ”	419
$O(\cdot), o(\cdot)$	big O and little o	388
$(\Omega, \mathcal{F} \cdot)$	the underlying filtered measurable space	21

\mathcal{O}	σ -algebra of optional or well-measurable sets	440
ω	the typical point (s, ω) of $\mathbb{R}_+ \times \Omega$	22
\mathbb{P}	the pertinent probability on (Ω, \mathcal{F})	3
\mathfrak{P}	the pertinent probabilities	32
\mathcal{P}_{00}	the bdd. predictable processes with bdd. carrier	128
\mathcal{P}_b	the bounded predictable processes	135
$\mathfrak{P}[Z]$	the probabilities for which Z is an L^0 -integrator	61
$\check{\mathcal{P}} \stackrel{\text{def}}{=} \mathcal{B}^\bullet(\mathbf{H}) \otimes \mathcal{P}$	$= (\mathcal{E}[\mathbf{H}] \otimes \mathcal{E}[\mathcal{F}])^\sigma$, predictable random functions	172
$\mathfrak{P}^*(E) = \mathfrak{M}_{1,+}^*(E)$	the probabilities on $C_b(E)$	421
$\mathfrak{P}^\bullet(E) = \mathfrak{M}_{1,+}^\bullet(E)$	the order-continuous probabilities on E	421
$p^\diamond = p^\diamond[Z]$	p if Z jumps, 2 otherwise	238
$1^\diamond = 1^\diamond[Z]$	2 if Z is a martingale, 1 otherwise	238
$\mathcal{P} = \mathcal{P}[\mathcal{F}.]$	the predictable processes or σ -algebra	115
$\mathcal{P}^\mathbb{P}$	the processes previsible with \mathbb{P}	118
\mathbb{P}_t	the restriction of \mathbb{P} to \mathcal{F}_t	40
\mathbb{Q}	the rationals	363
\mathbb{Q}^t	$\stackrel{\text{def}}{=} \{q \in \mathbb{Q} : 0 \leq q < t\} \cup \{t\}$	26
\mathbb{R}_+	the positive reals, i.e., the reals ≥ 0	363
\mathbb{R}_*^d	punctured d -space $\mathbb{R}^d \setminus \{0\}$	363
T_A	the reduction of $T \in \mathfrak{T}$ to $A \in \mathcal{F}_T$	31
0_A	the stopping time 0 reduced to $A \in \mathcal{F}_0$	48
$\bar{\rho}(r, s)$	the arctan metric on $\overline{\mathbb{R}}$	364
$R^l F[u; v]$	Taylor Remainder of degree l of F as $v \rightarrow u$	305
$\overline{\mathbb{R}}$	the extended reals $\{-\infty\} \cup \mathbb{R} \cup \{\infty\}$	363
\mathbb{R}	the reals	363
$\sigma, \mathcal{E}^\sigma, \mathcal{E}_{\mathbb{R}}^\sigma$	σ denotes sequential closure, of \mathcal{E}	392
sgn	$\text{sgn } z = 1, 0, -1$ according as $z > 0, = 0, < 0$	388
sign	$\text{sign } x = 1, -1$ according as $x \geq 0, < 0$	330
\mathfrak{s}_M	Banach space of paths with $\ \cdot \ _M < \infty$	275
$\mathfrak{V}, {}^j\mathfrak{V}$	continuous & jump part of finite variation process V	69
$\tilde{c}Z, {}^rZ$	continuous martingale part of Z , rest $Z - \tilde{c}Z$	235
$\tilde{s}Z \ \& \ {}^lZ$	small-jump martingale part & large-jump part of Z	237
$\hat{v}Z$	a continuous finite variation part of Z	237
pZ	the part of Z supported on a sparse previsible set	235
qZ	the quasi-left-continuous rest $Z - {}^pZ$	235
$[Z, Z], \mathfrak{q}[Z, Z] \ \& \ {}^j[Z, Z]$	square bracket, its continuous & jump parts	148
$[Y, Z], \mathfrak{q}[Y, Z] \ \& \ {}^j[Y, Z]$	square bracket, its continuous & jump parts	150
$\mathfrak{q}[Y, Z]$	continuous part of the square bracket	150
${}^j[Y, Z]$	jump part of the square bracket	150

$\mathfrak{G}_{p,M}^n$	processes with finite Picard Norm $\ \cdot\ _{p,M}$	283
$\mathfrak{G}_{p,M}^{*n}$	processes with finite Picard Norm $\ \cdot\ _{p,M}^*$	283
$S[Z] \ \& \ \sigma[Z]$	square function & continuous square function of Z	148
$\sigma[Z]$	continuous square function of Z	148
\mathcal{S}	Schwartz space of C^∞ -functions of fast decay	269
$\sigma(C_b^*(E), C_b(E))$	the topology of weak convergence of measures	421
Z^t	$Z_s^t = Z_{s \wedge t}$ is the process Z stopped at t	23
Z^T	$Z_s^T = Z_{T \wedge s}$ is the process Z stopped at $T \in \mathfrak{T}$	28
$\sigma(\mathcal{V}, \mathcal{M})$	topology generated on \mathcal{V} by the functions \mathcal{M}	381
$Z^{\mathcal{S}}$	the \mathcal{S} -scalæfication of Z	139
$[Z, Z]$	the square bracket of Z	148
${}^c[Z, Z], {}^j[Z, Z]$	its continuous & jump parts	148
${}^j[Z, Z]$	the jump part of the square bracket of Z	148
$T^l F[u]$	Taylor polynomial of degree l of F at u	305
$\mathfrak{T} = \mathfrak{T}[\mathcal{F}.]$	the \mathcal{F} -stopping times	27
$\llbracket T \rrbracket = \llbracket T, T \rrbracket$	the graph of the stopping time T	28
$T^\bullet : \lambda \mapsto T^\lambda$	THE time transformation for Z	239
$T_{p,q}(\cdot)$	type of a map or space	461
$\mathcal{U} = U_\alpha(C_0(E))$	the range of the resolvent operators	463
$X_{.-} \ \& \ X_{.+}$	left- & right-continuous version of X	24
$X_{.+}$	the right-continuous version of X	24
V^μ	the Doléans–Dade process of μ	222
$\Lambda^{(q)}[Z]$	a previsible fin. var. process controlling Z	245
$\Lambda^{(q)}[\zeta]$	a previsible controller	251
$ z , \mu $	variation of distribution function z , or measure μ	45
$ dz = dz $	the variation measure of the measure dz	45
$\widehat{J}_Z \ \& \ \widetilde{J}_Z$	compensator & compensatrix of jump measure	232
\widetilde{J}_Z	compensated part of the jump measure	232
\mathbb{W}	Wiener measure	16
\underline{W}	Wiener process as a $C[0, \infty)$ -valued random variable	14
$\mathcal{F}^0[W.]$	the basic filtration of Wiener process	18
$\xi^f(x) = \xi(x, \cdot; f)$	the flow generated by f	278
$Z^{[\nu]}$	the higher order brackets	239
$Z^{(\rho)}$	higher order previsible brackets	240
\dot{f}	the equivalence class of f mod negligible functions	13
$Z_\infty = Z_{\infty-}$	the limit (possibly $\pm\infty$) of Z at ∞	27
$\ll. \ \& \ \approx.$	local absolute continuity & local equivalence	40
\ll	denoting absolute continuity	407
$\approx.$	denoting local equivalence	40

$\ \cdot \ _{L^p(\mathbb{P})}^*$	the corresponding mean	452
$Z_\cdot(\omega)$	the path $s \mapsto Z_s(\omega)$	23
\Rightarrow	denoting weak convergence of measures	421
Z_T	the random variable $\omega \mapsto Z_{T(\omega)}(\omega)$.	28
Z_s	the function $\omega \mapsto Z(s, \omega)$	23
$\zeta^T = \llbracket 0, T \rrbracket \zeta$	the random measure ζ stopped at T	173
$a \sim b$	means both a/b and b/a are bounded by a constant $< \infty$	218
$\widehat{\zeta}, \widetilde{\zeta}$	previsible & martingale parts of random measure ζ	231
$\widetilde{\zeta}$	martingale part of the random measure ζ	231
$\widehat{Z}, \widetilde{Z}$	previsible & martingale parts of the integrator Z	221
$\zeta[X]$	lifetime of the solution X	273

Symbols

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