
Index

- absolute continuity
 - Bouleau and Hirsch's criterion, 108
 - in \mathbb{R}^m , 110
 - in dimension one, 106, 211, 213
 - under Lipschitz coefficients, 122
- adapted process, 223
- Black–Scholes model, 97
- Brownian motion, 1
 - hitting time, 12
 - law of the iterated logarithm, 6
 - local time, 36
 - self-intersection, 91
 - modulus of continuity, 5
 - multidimensional, 2
 - quadratic variation, 6
 - reflection principle, 14
 - strong Markov property, 14
- Brownian sheet, 8
- Burkholder–David–Gundy inequality, 26, 226
- chain rule, 54, 186, 206
- Clark–Ocone formula, 87
 - for jump processes, 192
- closable operator, 53, 55, 205
- contraction, 64, 176
- density
 - existence of, 217
 - formula, 106
 - Bally–Caramellino, 112
 - log-likelihood, 116
 - multidimensional, 110
 - Nourdin–Viens, 84
 - smoothness of, 110, 124
- derivative operator, 51, 182, 202
 - directional, 69, 208
 - iterated, 55
- distance
 - Kolmogorov, 133
 - total variation, 133
 - Wasserstein, 133
- divergence operator, 52, 187
 - domain, 55, 187
- Doob's maximal inequalities, 25, 226
- duality formula, 52, 55, 187
- Fokker–Planck equation, 124
- fourth-moment theorem, 140
 - for Poisson random measures, 199
 - multidimensional, 141
- fractional Brownian motion, 59, 146
 - self-intersection local time, 100
- Gaussian process, 58, 222
- Girsanov's theorem, 44, 174
- Hörmander's condition, 124
- Hörmander's theorem, 124
- Hermite polynomials, 64
- hypercontractivity property, 75
- integration-by-parts formula, 39, 83, 109, 114, 201, 203, 209
- isonormal Gaussian process, 57
- Itô process, 30
 - multidimensional, 38
- Itô's formula, 31, 169
 - multidimensional, 38
- Itô–Lévy process, 169
- Kolmogorov's continuity theorem, 223
- Kolmogorov's extension theorem, 221
- Lévy process, 158
- Lévy–Khintchine representation, 158
- Leibnitz rule, 62
- Lie bracket, 123
- Malliavin matrix, 108
- Markov process, 10, 224
- martingale, 11, 225
 - local, 225
 - quadratic variation, 225

236

Index

- martingale, *continued*
 - representation theorem, 43, 173
- Mehler's formula, 74
- Meyer's inequality, 82
- nondegenerate random vector, 108
- Norris's lemma, 126
- Novikov's condition, 45
- optional stopping theorem, 226
- Ornstein–Uhlenbeck
 - generator, 78, 191
 - process, 80
 - semigroup, 74, 191
- Poisson process, 159
 - compound, 159
- Poisson random measure, 160
 - compensated, 160
- Poisson space, 162
- progressively measurable process, 19
- separating class, 133
- Sobolev seminorm, 54, 183, 205, 213
 - Hölder's inequality, 55
 - iterated, 55
- Sobolev space, 54, 182, 205, 213
 - iterated, 55
- Stein's equation, 132
 - solution, 132
- Stein's lemma, 131
- stochastic differential equation
 - definition, 118
 - existence and uniqueness of solution, 118
 - in Stratonovich sense, 124
 - with jumps, 213
- stochastic integral, 18
 - backward, 41
 - indefinite, 22
 - isometry property, 20
 - martingale property, 23
 - multiple, 63, 175
 - product formula, 64
 - representation theorem, 42, 172
 - with respect to a jump measure, 164
- Stratonovich integral, 40
- Stroock's formula, 66
- support of the law, 105
- symmetrization, 63, 175
- Tanaka's formula, 36
- white noise, 8, 58
- Wiener chaos expansion, 63, 65, 177
 - derivative of, 66
 - orthogonal projection onto, 76
- Wiener integral, 7
- Wiener measure, 9
- Wiener space, 9