

Index

- σ -algebra, 3
- 0–1 law, 110
- algebra, 3
- ball(open,closed), 3
- Banach
 - algebra, 202
 - functional, 152
 - limit, 154
 - space, 48
- Bernstein polynomials, 74, 351
- Brownian motion
 - absorbed, 305
 - as a martingale, 138
 - construction of, 133–137
 - definition of, 125
 - elastic, 321, 330, 343
 - minimal, 304
 - reflected, 294, 296
- canonical map (canonical homomorphism), 40
- Cauchy
 - equation, 34
 - flight, 271
 - problem, 259
 - process, 271
- cemetery, 304
- change of variables formula, 9
- Chapman–Kolmogorov equation, 296, 299
- character, 224
- character group, 225
- charge, 20
- coffin state, 304
- combination
 - convex, 43
 - linear, 43
- conditional expectation, 89
- convex hull, 43
- convolution, 10
 - on a semigroup, 12
- core, 245, 261
- cosine operator function, 258
- countable additivity, 4
- cumulative distribution function, 28
- d’Alembert’s formula, 286
- Dirac
 - (delta) measure, 12
 - equation, 290
- Dirichlet problem, 307
- distribution, 9
 - bilateral exponential, 221
 - exponential, 15
 - gamma, 15
 - Gaussian, 15
 - negative binomial, 218
 - normal, 15
 - Poisson, 15
 - symmetric, 275
 - uniform, 15
- Ehrenfest model, 354
- equation
 - Cauchy, 34
 - Chapman–Kolmogorov, 296, 299
 - cosine functional, 258
 - Hilbert, 205, 259
 - telegraph, 280, 327
 - with small parameter, 346
 - wave, 260, 281
- equibounded operators, 76
- equivalence
 - class, 40
 - relation, 40
- Ewens sampling formula, 354
- exchangeable, 99
- explosion, 339

- extended limit, 344
- field, 3
- finite-dimensional distribution, 190
- formula
 - Ewens sampling, 354
 - Feynman–Kac, 357
 - Trotter product, 357
- function
 - absolutely integrable, 7
 - Bessel, 281
 - bounded, 39
 - convex, 29
 - Hunt, 288
 - measurable, 7
 - of bounded variation, 17
 - simple, 7
 - vanishing at infinity, 57
- functional
 - Banach, 152
 - characteristic, 220
 - generating, 273
- Galton–Watson process, 105
- genetic drift, 115
- Gram–Schmidt orthonormalization
 - procedure, 128
- group
 - dual, 225
 - Kisyński, 13
 - Klein, 12
 - Lie, 288
- Hölder inequality, 31
- Helly’s principle, 187
- Hilbert
 - cube, 187
 - equation, 205, 259
- Hunt
 - function, 288
 - Theorem, 289
- independent
 - mutually, 23
 - pairwisely, 23
- inequality
 - Bessel’s, 129
 - Cauchy–Schwarz–Bunyakovski, 81
 - Chebyshev’s, 16
 - Doob’s L^p , 120
 - Hölder, 31
 - Jensen’s, 94
 - Markov, 16
 - maximal, 119
 - Minkowski, 32
 - upcrossing, 113
- inner product, 80
- isomorphism, 54
 - algebraic, 39
 - isometric, 55
- Itô
 - integral, 139, 145
 - isometry, 144
- kernel, 40
- Kingman’s coalescence, 351
- Lévy
 - Khinchine formula, 279
 - process, 270
 - Theorem, 139
- lattice, 222
- law of large numbers, 81, 112, 115
 - and ergodic theorem, 166
- least square regression, 128
- Lemma
 - Alexandrov’s, 185
 - Doob–Dynkin, 42
 - Fatou’s, 8
 - Kuratowski–Zorn, 151
- Lindeberg condition, 177
- map
 - measure-preserving, 166
 - non-singular, 103
- Markov
 - chain, 101
 - inequality, 16
 - operator, 76–79, 164
 - process, 297
 - property, 101
 - time, 118
- matrix
 - intensity, 255
 - Kolmogorov, 255
- measure, 4
 - absolutely continuous, 9
 - Dirac, 12
 - invariant, 164
 - regular, 6, 34, 159
 - signed, 20
 - translation invariant, 6
 - transport of, 9
- measure space, 4
- measures escaping to infinity, 172, 182
- median, 276
- metric
 - Fortet–Mourier, 180
 - Prohorov–Lévy, 180
- moments, 10
- natural filtration, 139
- nets, 180
- non-explosive, 337

- norm, 45
- one-point compactification, 58
- operator
- adjoint, 163
 - bounded linear, 63
 - extension of, 75
 - norm of, 65
 - closable, 331
 - closed, 240
 - dissipative, 330
 - dual, 163
 - Feller, 164
 - Frobenius–Perron, 103
 - graph of, 243, 331
 - Markov, 76–79, 164
 - non-densely defined, 365
 - part of, 311
 - projection, 83
 - characterization of, 85
 - related to a measure, 67
 - related to a random variable, 69
 - self-adjoint, 84
 - non-negative, 107
 - non-negative, a root of, 109
 - norm of, 85
 - sub-Markov, 334
 - translation, 66
 - unitary, 166
- orthogonal, 80
- parallelogram law, 82
- Poisson
- Kac process (telegraph process), 230, 280
 - approximation to binomial, 16
 - compound process, 269
 - distribution, 15
 - formula, 307
 - kernel, 15, 247
 - point process, 220
 - process, 268, 312
- polarization formula, 82
- positive maximum principle, 328
- process
- adapted, 119, 141
 - Feller, 302
 - Galton–Watson, 105
 - Lévy, 270
 - Markov, 297
 - time-homogeneous, 299
 - non-decreasing, 146
 - Ornstein–Uhlenbeck, 300, 354
 - point, 220
 - geometric, 221
 - Poisson, 220
 - previsible, 104
 - progressively measurable, 142
 - pseudo-Poisson, 307
 - pure death/birth, 338, 351
 - simple, 143
 - telegraph, 280
 - Wiener (*see* Brownian motion), 121
- property
- Lindelöf, 181
 - Markov, 101
 - memoryless, 89
 - tower, 93, 100
 - pseudo-resolvent, 343
- range, 40
- range condition, 330
- representation, 202
- Riemann–Stieltjes integral, 22
- scalar product, 80
- semi-norm, 45
- semicharacter, 224
- semigroup
- integrated, 311
 - of equibounded operators, 262
 - of operators, 246
 - continuous in the uniform topology, 251
 - infinitesimal generator of, 249
 - Laplace transform of, 256
 - of class c_0 , 247
 - strongly continuous, 247
 - of translations to the right, 247
 - topological, 12
- separation of points, 167, 222
- space
- Banach, 48
 - complete, 48
 - Hilbert, 82
 - inner product, 80
 - linear, 38
 - normed, 45
 - Polish, 178
 - unitary, 80
- span, 43
- standard probability space, 5
- Stirling numbers, 361
- Stratonovich integral, 142
- subspace, 46
- algebraic, 39
- telegraph process, 230
- Theorem
- π - λ , 6
 - Alaoglu’s, 186
 - Arzela–Ascoli, 190
 - Baire’s category, 234
 - Banach–Steinhaus, 234

- Bolzano–Weierstrass, 2
- Campbell's, 78, 219
- Cayley–Hamilton, 252
- Central Limit, 176, 229
 - Lindeberg condition, 177
 - semigroup-theoretical proof of, 350
 - with random number of terms, 229
- Cohen's Factorization, 231
- Donsker, 193
- Doob's Optional Sampling, 118
- Fubini, 9
- Hahn–Banach, 151
- Hille–Yosida, 309
 - algebraic version of, 318
- Hunt, 289
- Kakutani–Krein, 222
- Lévy, 139
- Lebesgue Dominated Convergence, 8
- Lindeberg–Feller, 177
- Monotone Class, 6
- Monotone Convergence, 8
- of Pontryagin and Van Kampen, 225
- portmanteau, 179
- Prohorov's, 188
- Radon–Nikodym, 101
- Riesz, 158
- Scheffé's, 199
- Steinhaus, 34
- Stone–Weierstrass, 223
- Tichonov's, 185
- Tonelli, 9
- Trotter–Kato, 342
 - Sova–Kurtz version, 345
- Urysohn's, 187
- von Neumann's Ergodic, 166
- Weierstrass', 73
- tightness, 187
- topology, 1
 - Hausdorff, 1
 - weak, 167
 - weak*, 170
- transform
 - Fourier, 213
 - Fourier abstract, 225
 - Fourier cosine, 214
 - Gelfand, 206, 207
 - Laplace, 210
- Wiener
 - measure, 190
 - process, 125
- Wright–Fisher model, 105
- Yosida approximation, 311