

Index

- A_∞^d weights, 205
- adapted process, 157
- Ahlfors–Beurling operator, x, 206, 209, 232–234
- Ahlfors–Beurling transform, xvi, 206–208, 232, 233, 235, 238, 241
- Astala’s theorem, 232
- average profit, 157
- bad cube, 255, 256
- Bellman equation, x, xii, 168
- Bellman function, x, xi, xiii–xvi, 169, 211, 212, 228, 233
- Bellman function associated with Chang–Wilson–Wolff theorem, 372
- Bellman function for a weak estimate of the martingale transform, 66, 67, 71–73, 75
- Bellman function for maximal operator, 44–46, 50, 52, 55, 57, 58, 62
- Bellman function for the Buckley inequality, 13, 137, 138
- Bellman function for the Buckley inequality, lower, 139, 142
- Bellman function generated by a weak estimate of a square function, 113
- Bellman function generated by a weak estimate of a square function, 113
- Bellman function of a toy problem, 1–3, 5
- Bellman function of John–Nirenberg inequality in integral form, 15, 18, 21
- Bellman function of stochastic optimal control, 156
- Bellman function of stochastic optimal control problem, 157
- Bellman PDE, 156, 158, 164
- Bellman point, 2, 6, 15, 18, 25, 44, 45, 53, 54, 63, 66
- Bellman principle, 158, 159
- Bellman transfer, 277
- Beltrami equation, 232
- Bernoulli variables, 165
- bilinear embedding, 269, 271, 299
- Bollobás function, 372
- Bollobás function, 383
- bonus function, 157, 167, 172, 178, 179, 181, 184, 185, 197, 198
- boundary condition, 158, 160, 175–177
- Brownian motion, xiii, 150, 159, 207, 211, 233, 236
- Brownian path, 236
- Buckley inequality, 7, 12
- Buckley’s Bellman function, 15
- Buckley’s inequality, 165
- Buckley’s inequality, 137
- Burkholder’s Bellman function, 80, 82–84, 86–88, 104, 106
- Burkholder’s theorem for martingales, 232, 233
- Burkholder–Bellman function, 178
- Burkholder–Davis–Gundy inequality, 208
- Burkholder’s Bellman function, 80
- Carleson measure, 165, 170
- Cauchy–Riemann equations, 163
- Chang–Wilson–Wolff theorem, 114, 400
- chordal domain, 34, 39, 40
- conformal martingale, 208, 209, 224
- conformal restrictions, 162
- conformality, 207, 209, 213, 234
- control process, 166, 167
- Control Theory, x
- cup domain, 39–42

- differentially subordinated martingale, 206, 233
- Doob inequality, 208
- dyadic Bellman function, 175
- dyadic Bellman function of
 - John–Nirenberg inequality in integral form, 15, 20, 23
- dyadic maximal operator, 43
- dyadic shift, 247, 248, 250, 251, 266, 286
- dyadic shift, complexity, 250–252, 262, 265–267, 277, 286–289, 291, 292, 296, 297, 326
- dyadic shift, nonhomogeneous, 248
- dyadic shift, weighted estimates, 266
- dyadic singular operators, 286, 292
- dynamic programming, 158, 159
- emulating functions by stochastic process, 165
- endpoint estimate, 334, 335
- entropy bump, 327
- entropy of weight, 293
- Euler–Lagrange equation, xii
- extremal line, 25, 26, 29–32, 34, 35, 46, 47, 52, 53, 56, 62, 68, 69, 71, 75, 77, 84–87, 89, 90, 92, 106
- formal Bellman equation, 164, 167–169, 172, 173, 175, 176, 178, 179, 184, 188, 198
- Gehring–Reich conjecture, 232
- good cube, 255
- Haar basis, x, 408
- Haar decomposition, 165
- Haar function, 114, 115, 119–121, 128, 165, 249, 251, 267, 268, 288, 325, 335, 336, 346, 367, 408
- Haar system, xvii
- Hamilton–Jacobi equation, xiii, xv
- Hamilton–Jacobi–Bellman equation, xi, xiii
- Hausdorff–Young inequality, xi
- Hessian, 18, 20, 27–29, 148, 162, 176
- Hessian matrix, xvii, 28
- Hilbert transform, 163
- Itô’s formula, 213, 236
- Itô’s integral, 154
- Itô’s formula, 155
- Iwaniec conjecture, 232
- Jensen’s inequality, 166
- John–Nirenberg Bellman function, 31, 33
- John–Nirenberg inequality, 30, 174
- John–Nirenberg inequality, integral form, 14
- John–Nirenberg inequality, weak form, 27
- Laguerre equation, 216–219, 223, 225, 228
- Laplacian, 162
- left-hand side conformality, 207, 209, 210, 226, 228, 234, 246
- Lorentz space, 298, 317–319
- martingale, xiv, xv
- martingale differences, xiv
- martingale transform, xvi, 62, 63, 71, 79, 335–337, 352–354, 360, 361, 411
- matrix Itô’s formula, 158
- matrix Itô’s formula, 156
- Monge–Ampère equation, 28–32, 40, 46, 68, 83, 84, 87–89, 95, 170, 171, 177, 181, 334, 418
- Muckenhoupt condition, 319
- multipcup domain, 42, 43
- multiplier theorems, xi
- multitrolleybus domain, 42
- obstacle condition, 144, 145, 160, 168, 169, 172, 176, 179, 181, 185–189, 192, 193, 198–200, 202, 203
- obstacle problem for square function operator, 367–369, 373, 382, 384
- Orlicz space, 317–319
- paraproduct, 251, 252, 268, 295–297, 316, 317, 326–328
- PDE of Monge–Ampère type, 169
- Pełczyński’s problem, x
- Pichorides constants, 164
- pluri-superharmonic, 199, 200, 202–204
- profit function, 157, 166–168, 172, 173, 175, 176, 178, 179, 184, 185, 197, 198
- random dyadic lattices, 248, 254
- random walk, 166, 176–179
- Riesz transform, 232, 237
- right-hand side conformality, 209, 210, 224, 231
- saturation of conditions, 168, 170
- sparse domination, 248
- sparse dyadic shift, 247
- Stochastic differential, 155
- stochastic integral, 150
- subharmonic, 187, 189, 200, 202, 204, 205
- super-reflexive, xiv
- superharmonic, 186–188, 192, 194, 202, 204

Index

445

- superharmonic majorant, 187, 200
supersolution, 114, 120–122, 125, 126,
130, 161, 218, 223, 228
T1 theorem, 248, 254, 293
T1 theorem, nonhomogeneous, 254
tangent domain, 39–43
trolleybus domain, 41
two weight estimates for singular integrals,
292
two-sided conformality, 209
uniformly convex, xiv
variance, 151
verification theorems, 158, 164, 166, 169,
171, 173, 175, 177, 181, 187, 188,
192, 194, 200, 202
viscosity subsolution, 352
viscosity supersolution, 352,
353
Young function, 293, 319–322