

Index

- c() operator, 9
- Association for Computing Machinery, xiv
- APL, 11
- Apple operating system, 3, 7
- approximation, 33, 37, 55, 64, 88, 196, 204, 211, 215, 263, 270, 316, 319, 329, 339–341, 348, 354, 367
- arguments, 11–13, 15, 19, 66, 68
- array slice, 14
- assignment operator, 11, 12
- Augmented Dickey–Fuller, 100
- auto-regressive conditional heteroskedasticity, 123
- auto-regressive integrated moving average, 105, 110, 112, 113, 115, 128, 129
- auto-regressive moving average, 98, 104, 105, 110, 120, 128
- autocorrelation function, 104, 105, 111, 112, 115, 128, 129, 253
- Bayes information criterion, 104
- Bayesian reasoning, 247, 249, 250, 259, 266, 278
- Bernoulli distribution, 350–352
- beta distribution, 250, 259
- Big Data, 1, 2, 9
- Binomial Asset Pricing Model, 318, 323, 324, 326–329
- binomial distribution, 18, 87–89, 251, 266, 350, 351, 354
- binomial tree, 318, 319, 322–326, 329, 330
- Black–Scholes, 324, 326, 327, 330–332, 335, 338, 340, 341, 346, 347
- bond holder, 44
- bond issuer, 45
- branching, 314, 348
- C, xv, 7
- C++, xv, 7, 9, 345–347
- C#, xv
- call option, 325, 330, 335, 336, 338, 340–343, 349
- calling environment, 12
- channel, xiii
- classification, 197
- classification and regression tree, 195, 306, 309, 312
- classification tree, 314
- cluster coefficient, 210
- clustering, 197, 203, 204, 208, 218, 230, 234, 237–239
- clustering algorithms, 6
- clustering coefficient, 210, 211, 230, 231, 235, 238
- coefficient, 232, 235, 351, 367, 369
- contour, 166, 168, 170
- convergence, 51, 205, 324, 326, 330, 339, 341, 342, 365
- correlation coefficient, 37
- covariance matrix, 73, 133–135, 170, 172, 173, 183, 187, 189, 190, 202, 208, 211–214, 221, 222, 224, 245, 285, 361
- cross-entropy, 310
- data mining, xiv, 4, 5, 157, 170, 195, 279, 281, 297
- decision making, 2, 3, 5, 264, 298, 366
- decision tree, 309, 310, 315, 316
- density plot, 18, 82, 224, 225, 305
- deviance, 310
- equality constraints, 161, 163–166, 172, 176
- evaluation, 12, 325
- exponential distribution, 357, 358
- financial laboratory, xiii, xvi
- FORTRAN, 7, 204, 356
- gamma distribution, 357, 361
- Gaussian (Normal) distribution, 18, 32, 37, 42, 55, 77, 79–84, 88, 89, 128, 129, 153, 163, 211, 242, 250, 257, 259, 308, 330–332, 337, 338, 341, 350, 355, 357–360, 362, 364–366
- Gaussian (Normal) mixture model, 80–85
- generalized auto-regressive conditional heteroskedasticity, 120, 123–128
- geometric distribution, 352, 363
- Gini index, 310
- Glasso, 217, 218, 225, 226, 230–232, 236, 238, 239
- Google Chrome operating system, 179
- google.com, 136
- gross returns, 39, 141, 144, 145, 147, 149, 154, 287

- histogram, 18, 80, 129, 146, 247, 249, 285, 343, 344, 353, 355
 historical volatility, xiii, 35, 36, 88, 271, 277
 implied, 344
 implied volatility, 331, 338–343, 345–349
 income statement, 136–138, 140–143, 145–147, 149–153, 155, 282, 283, 298–301, 306, 309, 311, 313–315
 inequality constraints, 161, 163–165, 167, 169, 176
 investment, xiv, 1, 2, 4, 6, 23, 35, 37, 39, 44–46, 48–50, 130–132, 142, 162, 163, 170, 208, 261, 262, 270, 281, 283
 investor, xiii, 1, 2, 6, 35, 48, 49, 51, 55, 88, 130, 131, 136, 141, 142, 147, 170, 186, 208, 215, 230, 232, 238, 261, 262, 270, 279, 281, 298, 299, 301, 306, 318, 319, 321, 322, 331, 345, 364
 Investor's Business Daily, xiii
 Java, xiii, xv, 9
 k-means clustering, 197, 200, 208
 knowledge discovery, xiii
 Knowledge Discovery and Data Mining, xiv
 Lasso, 165, 167, 168, 170, 173, 225
 lines of code, 79, 171, 266
 Linux operating system, 3, 7, 179
 Ljung–Box test, 105, 115, 116
 log returns, 35, 37, 38, 40, 53, 77–79, 81–83, 89, 90, 131–134, 163, 170, 172, 176, 189, 195, 198, 200–202, 204, 208, 211–213, 241, 253–259, 264–268, 270, 272, 277–279, 299–301, 303, 304, 360
 log-normal distribution, 37, 79, 328–332, 359
 long the bond, 45
 long the stock, 48
 machine learning, 6, 19, 54, 167, 195, 197, 247, 279, 297, 298, 306, 308
 Markov chain, 241, 243
 Matlab, xv
 McLeod–Li, 123
 multivariate normal distribution, 37, 208, 211
 net returns, 39, 40, 245
 Northrop Grumman, xiii
 optimization constraints, 162, 165–167, 184, 263
 partial autocorrelation function, 104, 105, 112, 128, 129
 Poisson distribution, 350, 352, 353, 363
 portfolio optimization, 4, 132, 153, 160–163, 165, 171, 183, 298
 posterior distributions, 250–252, 259, 266, 268
 precision matrix, 211, 212, 214, 215, 222, 225, 226
 prediction, 234, 235, 238, 279, 297, 298, 300, 308, 313–317, 368
 premium, 34, 51, 318, 321, 326, 328
 prior distribution, 250, 251, 266
 Prolog, 248
 put option, 319–321, 325, 338, 340, 341
 Python, xiii, xv
 quadratic programming, 160, 161, 195
 Quandl.com, 87
 random forest, 315
 recursion, 20, 243, 339, 341
 recursive partitioning, 308, 309, 312, 316
 regime switching, 240, 241, 243, 244, 247
 RKWard, 179
 RStudio, 3, 9, 77, 179
 shares of stock, 48
 short the bond, 45
 short the stock, 48
 shrinkage property, 167, 168, 173, 225
 simulation, xiv–xvi, 1–3, 64, 77, 81, 87, 90, 157, 170–173, 179, 198, 222, 226, 239, 263, 264, 268, 271, 272, 275, 276, 278, 333–335, 348
 SQL, 281
 state transition diagram, 241, 271
 statistical learning, 315
 statistical model, 2
 strike price, 319–322, 325–328, 338–346, 349
 super-assignment operator, 12, 13, 264
 support vector machine, 315
 t-distribution, 359
 tick, 86
 ticker symbol, 54, 56, 61, 68–71, 131, 132, 140, 150, 153–156, 178, 181–183, 186–188, 190, 191, 193–196, 198, 203, 208, 213, 220, 226, 298, 301, 306, 316
 trading days, 55, 132, 197, 212, 237, 301, 319
 trading strategy, 259, 261
 tree, 298, 299, 307–309, 312–314, 323–326, 329
 Unix operating system, 7
 volatility smile, 339, 343–345
 Windows operating system, 3, 7
 winning ratio, 265, 275, 277, 279, 280
 Wishart distribution, 221–225
 yahoo.com, xiii, 64, 68, 71, 136, 153, 182