

Index

- α -Winsorized means, 316
- α -trimmed means, 316
- absolute rank, 181
- absolutely
 - continuous, 85, 268
 - continuous part, 85
- accessible, 150
- adaptation, 223
- adjoint map, 361
- adjoint score operator, 372
- antiranks, 184
- Assouad's lemma, 347
- asymptotic
 - consistent, 44, 329
 - differentiable, 106
 - distribution free, 164
 - efficient, 64, 367, 387
 - equicontinuity, 262
 - influence function, 58
 - of level α , 192
 - linear, 401
 - lower bound, 108
 - measurable, 260
 - relative efficiency, 195
 - risk, 109
 - tight, 260
 - tightness, 262
 - uniformly integrable, 17
- Bahadur**
 - efficiency, 203
 - relative efficiency, 203
 - slope, 203, 239
- Bahadur-Kiefer theorems, 310
- Banach space, 361
- bandwidth, 342
- Bartlett correction, 238
- Bayes
 - estimator, 138
 - risk, 138
- Bernstein's inequality, 285
- best regular, 115
- bilinear map, 295
- bootstrap
 - empirical distribution, 332
 - empirical process, 332
 - parametric, 328, 340
- Borel
 - σ -field, 256
 - measurable, 256
- bounded
 - Lipschitz metric, 332
 - in probability, 8
- bowl-shaped, 113
- bracket, 270
- bracketing
 - integral, 270
 - number, 270
- Brownian
 - bridge, 266
 - bridge process, 168
 - motion, 268
- cadlag, 257
- canonical link functions, 235
- Cartesian product, 257
- Cauchy sequence, 255
- central
 - limit theorem, 6
 - moments, 27
- chain rule, 298
- chaining argument, 285
- characteristic function, 13
- chi-square distribution, 242
- Chibisov-O'Reilly theorem, 273
- closed, 255
- closure, 255
- coarsening at random (CAR), 379
- coefficients, 173
- compact, 255, 424
- compact differentiability, 297
- complete, 255
- completion, 257
- concordant, 164
- conditional expectation, 155
- consistent, 3, 149, 193, 329

- contiguous, 87
- continuity set, 7
- continuous, 255
- continuously differentiable, 297
- converge
 - almost surely, 6
 - in distribution, 5, 258
 - in probability, 5
 - weakly, 305
- convergence
 - in law, 5
 - of sets, 101, 232
- convergence-determining, 18
- converges, 255
 - almost surely, 258
 - in distribution, 258
 - to a limit experiment, 126
 - in probability, 258
- coordinate projections, 257
- Cornish-Fisher expansion, 338
- covering number, 274
- Cox partial likelihood, 404
- Cramér's
 - condition, 335
 - theorem, 208
- Cramér–Von Mises statistic, 171, 277, 295
- Cramér–Wold device, 16
- critical region, 192
- cross-validation, 346
- cumulant generating function, 205
- cumulative hazard function, 180, 300

- defective distribution function, 9
- deficiency distance, 137
- degenerate, 167
- dense, 255
- deviance, 234
- differentiable, 25, 363, 387
 - in quadratic mean, 64, 94
- differentially equivalent, 106
- discretization, 72
- discretized, 72
- distance function, 255
- distribution
 - free, 174
 - function, 5
- dominated, 127
- Donsker, 269
- dual space, 361, 387
- Dzhaparidze–Nikulin statistic, 254

- ε -bracket, 270
- Edgeworth expansions, 335
- efficient
 - function, 369, 373
 - influence function, 363
 - information matrix, 369
 - score equations, 391

- Efron's percentile method, 327
- ellipsoidally symmetric, 84
- empirical
 - bootstrap, 328
 - difference process, 309
 - distribution, 42, 269
 - distribution function, 265
 - likelihood, 402
 - process, 42, 266, 269
- entropy, 274
 - with bracketing, 270
 - integral, 274
 - uniform, 274
- envelope function, 270
- equivalent, 126
- equivariant-in-law, 113
- errors-in-variables, 83
- estimating equations, 41
- experiment, 125
- exponential
 - family, 37
 - inequality, 285

- finite approximation, 261
- Fisher
 - information for location, 96
 - information matrix, 39
- Fréchet differentiable, 297
- full rank, 38

- Gateaux differentiable, 296
- Gaussian chaos, 167
- generalized inverse, 254
- Gini's mean difference, 171
- Glivenko–Cantelli, 46
- Glivenko–Cantelli theorem, 265
- good rate function, 209
- goodness-of-fit, 248, 277
- gradient, 26
- Grenander estimator, 356

- Hájek projection, 157
- Hadamard differentiable, 296
- Hamming distance, 347
- Hellinger
 - affinity, 211
 - distance, 211
 - integral, 213
 - statistic, 244
- Hermite polynomial, 169
- Hilbert space, 360
- Hoeffding decomposition, 157
- Huber estimators, 43
- Hungarian embeddings, 269
- hypothesis of independence, 247

- identifiable, 62
- improper, 138

- influence function, 292
- information operator, 372
- interior, 255
- interquartile range, 317
- joint convergence, 11
- $(k \times r)$ table, 247
- Kaplan-Meier estimator, 302
- Kendall's τ -statistic, 164
- kernel, 161, 342
 - estimator, 342
 - method, 341
- Kolmogorov-Smirnov, 265, 277
- Kruskal-Wallis, 181
- Kullback-Leibler divergence, 56, 62
- kurtosis, 27
- L -statistic, 316
- Lagrange multipliers, 214
- LAN, 104
- large
 - deviation, 203
 - deviation principle, 209
- law of large numbers, 6
- Le Cam's third lemma, 90
- least
 - concave majorant, 349
 - favorable, 362
- Lebesgue decomposition, 85
- Lehmann alternatives, 180
- level, 192
 - α , 215
- likelihood
 - ratio, 86
 - ratio process, 126
 - ratio statistic, 228
- linear signed rank statistic, 221
- link function, 234
- Lipschitz, 6
- local
 - criterion functions, 79
 - empirical measure, 283
 - limiting power, 194
 - parameter, 92
 - parameter space, 101
- locally
 - asymptotically
 - minimax, 120
 - mixed normal, 131
 - normal, 104
 - quadratic, 132
 - most powerful, 179
 - scores, 222, 225
 - signed rank statistics, 183
 - test, 190
- log rank test, 180
- logit model, 66
- loss function, 109, 113
- M -estimator, 41
- Mann-Whitney statistic, 166, 175
- marginal
 - convergence, 11
 - vectors, 261
 - weak convergence, 126
- Markov's inequality, 10
- Marshall's lemma, 357
- maximal inequality, 76, 285
- maximum
 - likelihood estimator, 42
 - likelihood statistic, 231
- mean
 - absolute deviation, 280
 - integrated square error, 344
- median
 - absolute deviation, 310
 - absolute deviation from the median, 60
 - test, 178
- metric, 255
 - space, 255
- midrank, 173
- Mill's ratio, 313
- minimax criterion, 113
- minimum-chi square estimator, 244
- missing at random (MAR), 379
- mode, 355
- model, 358
- mutually contiguous, 87
- \sqrt{n} -consistent, 72
- natural
 - level, 190
 - parameter space, 38
- nearly maximize, 45
- Nelson-Aalen estimator, 301
- Newton-Raphson, 71
- noncentral chi-square distribution, 237
- noncentrality parameter, 217
- nonparametric
 - maximum likelihood estimator, 403
 - model, 341, 358
- norm, 255
- normed space, 255
- nuisance parameter, 358
- observed
 - level, 239
 - significance level, 203
- odds, 406
- offspring distribution, 133
- one-step
 - estimator, 72
 - method, 71

442

open, 255
 ball, 255
 operators, 361
 order statistics, 173
 orthocomplement, 361
 orthogonal, 85, 153, 361
 part, 85
 outer probability, 258

P-Brownian bridge, 269
P-Donsker, 269
P-Glivenko-Cantelli, 269
*p*th sample quantile, 43
 parametric
 bootstrap, 328, 340
 models, 341
 Pearson statistic, 242
 percentile
 t-method, 327
 method, 327
 perfect, 211
 permutation tests, 188
 Pitman
 efficiency, 201
 relative efficiency, 202
 polynomial classes, 275
 pooled sample, 174
 posterior distribution, 138
 power function, 215
 prior distribution, 138
 probability integral transformation, 305
 probit model, 66
 product
 integral, 300
 limit estimator, 302, 407
 profile likelihood, 403
 projection, 153
 lemma, 361
 proportional hazards, 180

quantile, 43
 function, 304, 306
 transformation, 305

random
 element, 256
 vector, 5
 randomized statistic, 98, 127
 range, 317
 rank, 164, 173
 correlation coefficient, 184
 statistic, 173
 Rao-Robson-Nikulin statistic, 250
 rate function, 209
 rate-adaptive, 346
 regular, 115, 365
 regularity, 340
 relative efficiency, 111, 201

Index

right-censored data, 301
 robust statistics, 43

sample
 correlation coefficient, 30
 path, 260
 space, 125
 Sanov's theorem, 209
 Savage test, 180
 score, 173, 221
 function, 42, 63, 362
 operator, 371
 statistic, 231
 tests, 220
 semimetric, 255
 seminorm, 256
 semiparametric models, 358
 separable, 255
 shatter, 275
 shrinkage estimator, 119
 Siegel-Tukey, 191
 sign, 181
 statistic, 183, 193, 221
 sign-function, 43
 signed rank
 statistic, 181
 test, 164
 simple linear rank statistics, 173
 single-index, 359
 singular part, 86
 size, 192, 215
 skewness, 29
 Skorohod space, 257
 slope, 195, 218
 smoothing method, 342
 solid, 237
 spectral density, 105
 standard (or uniform) Brownian bridge, 266
 statistical experiment, 92
 Stein's lemma, 213
 stochastic process, 260
 Strassen's theorem, 268
 strong
 approximations, 268
 law of large numbers, 6
 strongly
 consistent, 149
 degenerate, 167
 subconvex, 113
 subgraphs, 275

r-topology, 209
 tangent set, 362
 for η , 369
 tangent space, 362
 tangentially, 297
 test, 191, 215
 function, 215

- tight, 8, 260
- total
 - variation, 22
 - variation distance, 211
- totally bounded, 255
- two-sample U -statistic, 165

- U -statistic, 161
- unbiased, 226
- uniform
 - covering numbers, 274
 - entropy integral, 274
 - Glivenko-Cantelli, 145
 - norm, 257
- uniformly
 - most powerful test, 216
 - tight, 8
- unimodal, 355
- uprank, 173

- V -statistic, 172, 295, 303
- van der Waerden statistic, 175
- Vapnik-Červonenkis classes, 274

- variance stabilizing transformation, 30
- VC class, 275
- VC index, 275
- Volterra equation, 408
- von Mises expansion, 292

- Wald
 - statistic, 231
 - tests, 220
- Watson-Roy statistic, 251
- weak
 - convergence, 5
 - law of large numbers, 6
- weighted empirical process, 273
- well-separated, 45
- Wilcoxon
 - signed rank statistic, 183, 221
 - statistic, 175
 - two-sample statistic, 167
- window, 342

- Z -estimators, 41