Subject Index

adaptive algorithm 149, 163
algorithm
  adaptive 149, 163
  k-means 240
  LBG 237
  Newton-Raphson 145
analysis
  correspondence 195
  covariance structure 123, 347
  discriminant 6, 163
  factor 1, 123, 297, 369
  interim 263
  logratio 73
  prequential 211
  regression 3, 26, 440, 445, 461
  of variance, multivariate 1, 97
ancillary directions 253
arrangement increasing functions 56
associated random variables 65
asymptotics
  Box approximation 133, 137, 327
  chi-squared distribution 369
  covariance matrix 225, 301
  distribution 2, 178, 315, 323, 347, 369
  efficiency 127, 413
  modulated densities 253
  optimality 151, 164
  third order 253

Bartlett's test 323
base component 360
Bayesian discrimination 220
Bayesian inference 211, 221, 263
  hypothesis testing 211, 221, 323
  posterior-sampler 221
Bayesian risk 149
  consistent 149
  efficiency 331
beta distribution 390
  multivariate 37
bootstrap procedures 449
Box approximation, 133, 137, 327

canonical correlation 177
canonical functions 199
canonical parameter 253
change-point 397
characterization of distributions 37
chi-square distribution 111, 123, 390
  asymptotic 369
  non-central 144, 263
circular model 143
classification 217
cluster regression 369
cluster sampling 83, 369
Cochran's Theorem 111, 394
complex model
  hierarchical 221
  survey designs 221
compositional data 73
concomitant variables 253
concordant of order r 139
conditional bias 281
conditional independence 97
confidence region 37, 461
  for change point 397
confirmatory factor analysis 123, 297
confluent hypergeometric function 144
conjugate prior 202, 217
consistent estimate 126, 143, 203

contingency table 195
convergence rate 161
convex function, symmetric 137
coplot 21
correlation
  canonical 10, 177
  ecological 37
  matrix 289, 349
  polychoric 297
correspondence analysis 195
covariance matrix 114, 385
  asymptotic 225, 301
  components 83
  equality of 323, 385
covariance structure analysis 123, 347
cross-over trial 445
cross-validation 211
cumulative residual effect 445
curved exponential family 331, 461
curved family 315

data sets
  fire service 449
  local housing market 439
  megalithic stone rings 147
  real estate price 439
dependence orthant 55
determinism 211
diagnostic plot 30
differential geometric method 461
Dirichlet distribution 37, 360
discrepancy function 125
discriminant analysis 6, 163
  stepwise 398
distribution-free method 124, 347
distributions
  α-symmetric 366
  asymptotic 2, 178, 315, 323, 347, 369
  beta 390
  characterization of 37
  chi-square 111, 123, 144, 263, 369, 390
  Dirichlet 37, 360
  elliptically contoured 61, 126, 237, 457
  exponential 39, 413
  gamma 41
  L_1-norm 359
  Liouville 37, 359
  logistic-normal 73
  matrix-variate normal 185
  mixture 46, 123
  multivariate 37, 58, 126, 185, 331
  normal 76, 97, 134, 177, 203, 219, 263
  predictive 263
  prior 202, 323
  spherically symmetric 359
  t 369
  Wishart 3, 325, 385
distributive lattice 98

efficiency 369
  Bayesian risk 331
  for generalized least squares 281
efficiency scores 315
elliptically contoured distributions 61, 126, 237, 457
  curved family 311
  t-distribution 369
equality of covariance matrices 323, 385
equilibrium model 439
error rate 163, 217
estimation 2, 43, 127, 298
  Bayesian 226
  consistent 49, 144, 282
  kernel 21
  moment 125, 281
  small area 83, 221
exchangeability 55
exponential distribution 413
  multivariate 39
exponential family 311, 461

F-discrepancy 237
F-optimum 241

factor analysis 1, 369
  confirmatory 123, 297
Fisher information 461
Fisher ratio 163
Fréchet bound 55
functional equation 39
functional relationship 6, 143

gamma distribution, bivariate 41
generalized inverse 116
generalized least squares 86, 124, 347
generalized linear model 78, 254
geometric method, differential 461
goodness-of-fit test 123, 348
Grassmann manifold 177

hedonic approach 443
Hermite polynomial 200
hierarchical model, complex 221
highest posterior density 323
homogeneity of variances, Bartlett's test for 323
Hotelling's T-squared statistic 263
hypergeometric function, confluent 144

incidental parameter 13, 143
independence, conditional 97
inequality, stochastic 55, 137
inference
  Bayesian 211, 221, 263
  for linear models 1
information
  Fisher 461
  Kullback-Leibler 331
integral equation 198
interim analysis 263
invariant
  locally best 311, 457
  maximal 74, 313
invariant measure 177

k-means algorithm 240
kernel estimation 21
Kullback-Leibler information 331
kurtosis test 124, 312

L_1-norm distribution 359
latent variable 1, 123
lattice, distributive 98
LBG algorithm 237
least squares 2, 449
  generalized 86, 124, 347
likelihood ratio 4, 97, 257, 316, 331, 376, 385, 398, 457
linear model 1, 359
  cluster sampling 83, 369
  generalized 78, 254
  regression 97
Liouville distribution 37, 359
local fitting 21
loess 21
log-concavity 55
logistic-normal distribution 73
logratio analysis 73
loss of memory 40
Löwner partial ordering 115

Mahalanobis distance 167, 219
majorization 55
manifold
  Grassmann 177
  Stiefel 177
Mardia's test 311
matrix
  block-triangular 97
  correlation 289, 349
  covariance 83, 114, 225, 301, 323, 385
  precision 323
  Q- 163 9999 symmetric 111, 178
  -variate normal distribution 185
  weighting 281

maximum likelihood estimation 2, 97, 126, 305, 347, 369, 391, 403
mean slippage 457
mean square error 239
measure, invariant 177
Mehler identity 201
minimum distance estimation 143
mixture distribution 46, 123
model
  circular 143
  complex 221
  equilibrium 439
  generalized linear 78, 254
  hierarchical 221
  linear 1, 359
  multivariate mixed 83
  nonlinear 449, 461
  pricing 440
  random effect 281
  regression 3, 26, 369, 440, 445, 461
  structural 143, 308, 439
  structural equation 298, 347
  tangent 256
  urn 43
moment estimator 281
Monte Carlo sampling 123
Moore-Penrose inverse 114
multidimensional scaling 195
multiple outliers 457
multivariate analysis of variance 1, 97
multivariate distribution 37, 58, 126, 185, 331
  beta 37
  gamma 41
  exponential 39
  normal 97, 178, 203, 219, 263
multivariate mixed model 83
multivariate time series 221
mutually independent 113

nearest neighbor discrimination 149
Newton-Raphson algorithm 145
Neyman-Pearson Lemma, generalized 315
Neyman's partial score test 369
noncanonical link function 253
nonlinear model 449, 461
nonlinear multivariate transformation 331
normal distribution 76, 134, 177, 203, 263
  equality of covariance matrices 323
  matrix-variate 185
  mixture 311
  multivariate 97, 219
  test for 311
nuisance parameter 253, 376, 404
number-theoretic methods 237

ordering
  Löwner 115
  spectral 113
  star 111
ordering objects 195
ordinal variable 302
orthant dependence 66
orthogonal transformation 137
outlier 147, 173, 457

pairwise conditional independence 97
parameter
  canonical 253
  incidental 13, 143
  nuisance 253, 376, 404
parametric fit, conditionally 21
partition maximum likelihood 347
perturbation 79
polychoric correlation 297
polytomous variable 347
power function 313, 460
power of a test 397
precision matrix 323
predictive distribution 263
prequential analysis 211
pricing model 440

prior distribution 202, 323 ind probability
  inequality 55, 137
projection pursuit 163

Q-matrix 195
quadratic forms 89, 111, 125
quantizer 237
quasirandom number 237

radial component 359
random coefficient 83, 292
random effect 83, 225, 286, 427
  model 281
  specification 83
range anomaly 281
rank
  additivity 111
  test 427
regression model 3
  cluster 369
  local 26
  nonlinear 461
  quasilinear 445
  seemingly unrelated 440
rep-points 238
residual effect, cumulative 445
residual maximum likelihood 281
risk efficiency, Bayesian 331
robustness 128, 163, 370

saddlepoint approximation 253
sampling
  error, autocovariance 221
  plans 37, 359
scale invariance 73
Schur-concavity 55
score statistic 461
selection bias 216
sequential test 331
seriation 195
simplex sample space 75
simulation 37
  unbalanced data 281
small area estimation 83, 221
smoothing, kernel 28
spectral ordering 111
spherically symmetric distribution 359
splines 21
star ordering 111
stepdown test 385
Stiefel manifold 177
stochastic inequality 55, 137
stochastic representation 242
structural equation model 298, 347
structural model 143, 308, 439
structural relation 1, 298
survey design, complex 221
symmetric distribution, α- 366
symmetric matrix 111, 178
system tree 413

tailed probability 253
tangent model 256
test
  Bartlett's 323
  of covariance matrix 369
  goodness-of-fit 123, 348
  kurtosis 124, 312
  likelihood ratio 4, 97, 316, 331, 376, 385, 398, 457
  Mardia's 311
  Neyman's partial score 369
  of normality 311
  power 397
  rank 427
  sequential 331
  stepdown 385
  unbiasedness 457
  of variability 83
test statistics 91, 123, 355, 370, 429
  robust 370
  scaled 124
third order asymptotics 253

total positivity 196
tricube weight 26

unbiasedness of a test 457
unimodality 55
urn model 43

variability, test of 83
variable
  associated random 65
  chi-squared 113
  concomitant 253
  latent 1, 123
  observed 297
  ordinal 302
  polytomous 347
virtual system method 413

Wishart distribution 3, 325, 385