

INDEX

- Absolute continuity 99, 102

Admissibility 96, 169, 220, 223-226, 231-232, 237, 247, 256

Affine: projection 10
transformation 7

Aggregate exponential family 191-194, 203-206, 250

Analyticity 38

Asymptotic: normality 172-173
optimality 252

Bayes: acceptance region 40
procedure 262, 263
risk 97
test 69, 226, 246

(see also generalized Bayes)

Behrens-Fisher problem 68

Bessel function 77

Beta distribution 60, 150

Bhattacharya inequality 126

Binomial distribution 60, 76, 135, 136, 203

Bounded completeness 61

Canonical exponential family (see standard exponential family)

Cauchy-Schwarz inequality 91, 124

Censored exponential distribution 83-84, 163-165

Characteristic function 42

Chebyshev's inequality 208

Chi-squared distribution 28
(see also gamma distribution)

Complete class 107, 110, 220, 224, 228-230, 237, 256, 259

Completeness 42, 96, 230, 232
(see also bounded completeness)

Conditional: distribution 21, 30
dominating measure 25

Conical set 233, 251

Conjugate prior 90, 106, 112, 116, 168

Contingency table 27, 30, 67, 158, 177-178

Contiguous alternative 232, 250

Continuity Theorem for Laplace transforms 48-53

Convex: dual 178
hull 2
polytope 50
support 2

Convolution 61

Cramer-Rao inequality (see information inequality)

Critical function 220, 269

Cumulant generating function 1, 31, 38, 71, 145

- Curved exponential family 81, 83, 86-89, 126, 165, 173, 233, 252, 253
 (see also differentiable subfamily)
- Difference operator 105
- Differentiable: manifold 30, 160
 subfamily 81, 89, 92, 165, 172, 173
 (see also curved exponential family)
- Dirichlet: distribution 64, 167, 168
 process 167, 168
- Discrete exponential family 105, 136, 203
- D-optimality 226, 248
- E-M algorithm 171
- Entropy 174, 190, 212, 240
- Equicontinuity 52
- Essentially smooth 71
- Expectation parameter 112, 120, 124, 137-138, 141, 142
- Exponential distribution (see censored exponential distribution, gamma distribution)
- Exponential family: canonical parameter
 (see natural parameter)
 convexity property of 19
 dimension of 6
 full 2, 16, 80
 order of 16
 (see also curved exponential family, differentiable subfamily, discrete exponential family, mean value parameter, natural parameter, regular exponential family, standard exponential family, steep family, and specific families of distributions such as normal distribution, Poisson distribution, etc.)
- Exponentially fast 208
- Face of convex set 192
- Fatou's lemma 20, 182, 215
- Finite: parameter space 256, 261, 262
 sample space 193
 support 107, 149, 263, 266
- Fisher information 169
- Fisher-Von Mises distribution 76-78, 150, 204
- Fourier-Stieltjes transform 42
- F-test (Snedecor) 225, 226, 248
- Fundamental equation 160, 186-187
- Gamma distribution 18, 47, 60, 68, 76, 132, 133, 136, 210, 248, 250
 (see also matrix gamma distribution)
- Galton-Watson process 89
- Generalized: Bayes estimator 40, 90, 105-107, 110, 112, 140, 141
 least square estimate 170
- General linear model 29, 30, 158, 170, 224, 225
- Geometric distribution 27
 (see also negative binomial distribution)
- Green's Theorem 101, 112
- Hardy-Weinberg distribution 12, 157, 188
- Hölder's inequality 19
- Homogeneity of variance 248
- Homomorphism 74, 86
- Hotelling's T^2 test 226
- Hunt-Stein Theorem 227
- Hyperbolic secant distribution 61
- Inadmissibility 112, 135, 137, 142, 244, 249, 251, 253

- Information: matrix 93, 124
 inequality 90, 94, 97,
 105, 124, 125, 130
 (see also Fisher information,
 Kullback-Leibler information)
- Independence: in contingency tables
 27, 30, 67, 171, 247
 mutual 44, 63
- Independent observations 17, 166
- Infinite divisibility 61
- Inverse Gaussian distribution 72, 85
- James-Stein estimator 40, 90, 103, 112, 132
- Karlin's Theorem 90, 95, 112, 127, 139, 142
- Kronecker product 30
- Kullback-Leibler information 174, 175, 177, 185, 190, 212
 (see also entropy)
- Large deviations 211, 214, 239-240
- Legendre transformation 179
- Likelihood ratio test 255, 247, 249
- Linear estimator 90, 95
- Locally finite measure 48
- Local optimality 226
- Log linear model 11, 171
 (see also contingency table, Hardy-
 Weinberg distribution, multinomial
 distribution)
- Log Laplace transform 157, 160
 (see also cumulant generating
 function)
- Lower semi-continuity 19, 75, 145,
 179, 184, 215, 256, 258
- Marginal distribution 8, 64, 170
- Markov chain 28
- Markov stopping time 88
- Martingale 88
- Matrix: gamma distribution 30, 62, 64
 normal distribution 29
- Maximum likelihood estimator (M.L.E.)
 70, 135, 144, 152, 172-173,
 177, 186, 195
- McNemar's test 67
- Mean value parameter 70, 75, 150
- Method-of-moments 149
- Minimax 103, 169, 256, 260
- Minimal: entropy parameter 184
 complete class (see
 complete class)
 exponential family 2, 5, 72,
 74, 79, 84, 145, 149, 161
- Mixed parametrization 79, 243
- Moments 34-38, 50
- Monotone likelihood ratio 58
- Monotonicity 134
- Multinomial distribution 4, 11, 27,
 168, 203
 (see also binomial distribution, log-
 linear models)
- Multivariate: beta distribution 64
 linear model (see
 general linear model)
 normal distribution
 (see normal
 distribution)
- Natural parameter 1, 26, 45, 76, 106
- Nearly convex 246, 247
- Negative binomial distribution 27, 60,
 106
- Newton Raphson algorithm 171
- Neyman-Pearson lemma 248
- Normal distribution 36, 47, 60, 76,
 108, 116, 132, 134, 138, 170,
 218, 244, 245, 249, 252
- Odds ratio 31, 135

- Partial order 57
- Poisson: distribution 60, 76, 106, 135, 136, 137, 141, 203
process 88
- Polyhedral convex set 197, 205
- Quadratic variance function (QVF) 60
- Random effects model 171
- Regular exponential family 2, 22, 70, 79
- Regularly strictly convex 145, 147, 179, 182, 203
- Relative interior 192
- Schur convexity 59
- Sign change preserving 55, 66
- Similar test 61
- Slepian's inequality 69
- Squared error loss 95, 97, 103, 109, 134
- Stable distribution 72
- Standard exponential family 1, 35, 42, 43, 92, 166, 223
- Statistical curvature 82, 86, 88
- Steep family 70, 71, 75, 79, 145, 147, 149, 161, 169, 175, 180, 190, 208
- Stein's unbiased estimate 90
- Stratum 87, 88, 139-140, 172
- Strongly reproductive 18
- Student's t-test 218, 244
- Sufficient statistic 13, 17, 27, 185
- Support (of measure) 2, 191
- Tight (sequence of measures) 49
- Total positivity 53, 55
- Truncated (loss function) 97-99
- Unbiased test 61
- Uniform continuity 49
- Uniform distribution 77, 169
- Uniqueness (for Laplace transform) 42, 63
- Upper semi-continuity 148
- Von Mises distribution (see Fisher-Von Mises distribution)
- Weak convergence 48, 51, 257, 269
- Wishart distribution 30
- (see also Matrix gamma distribution)

