
Index

- ABC, *see* approximate Bayesian computation
- approximate Bayesian computation, 126
- Bayes factor, 11, 83
 - importance sampling estimate, 56
 - pseudo, *see* pseudo-Bayes factor
- Bayes' theorem, 7
- Bayesian
 - credible interval, 10
 - estimation, 8
 - inference, 6
 - p*-value, 71
 - testing, 11
- Bayesian residuals, 87
 - leaving-one-out, 73
 - predictive, 72
- BayesX, 192
 - BOA, 212
 - CODA, 212
- Bernoulli distribution, 224
- beta distribution, 29, 34, 40, 225
- beta-binomial distribution, 224
- beta-negative binomial distribution, 225
- binomial distribution, 23, 29, 40, 224
 - two samples, 34
- BOA, 179, 198, 201
- BUGS, *see* OpenBUGS
- CAVI, *see* coordinate ascent variational inference
- Chi-square distribution, 226
- classical inference, 2
- CODA, 179, 198, 201
- conditional predictive ordinate, 70, 73, 82, 216, 218
- conjugate family, 23
- consensus Monte Carlo, 68
- convergence diagnostic, 114, 198
 - Gelman and Rubin, 199
 - Geweke, 199
 - Heidelberg and Welch, 200
 - Raftery and Lewis, 200
- coordinate ascent variational inference, 165
- CPO, *see* conditional predictive ordinate
- INLA, 218
- data augmentation, 117, 118
- detailed balance condition, 94
- deviance, 79
 - Bayesian, 78
- deviance information criterion, *see* information criterion, DIC
- diagnostic summary, 81
- DIC, *see* information criterion, DIC
- Dirichlet distribution, 36, 227
- discrepancy measure, 71
- effective number of parameters, 78
- ELBO, *see* evidence lower bound
- entropy, 21
- ergodic theorem, 93
- Erlang distribution, 25, 226
- evidence lower bound, 164
- exponential distribution, 40, 226
- Fisher–Snedecor distribution, 227
- frequentist
 - confidence intervals, 3
 - estimation, 3
 - testing, 4
- full conditional distribution, 98
- gamma distribution, 30, 40, 41, 226
- geometric distribution, 24, 224
- Gibbs sampler
 - basic, 99
 - blocking, 100
 - data augmentation, 104
 - hybridization, 100

- HPD credible sets, 10
- hypergeometric distribution, 225
- importance sampling, *see* Monte Carlo,
 - importance sampling
- information criterion
 - AIC, 77
 - BIC, 77
 - DIC, 79, 216
 - WAIC, 80, 216
- INLA, 150, 161, 213
- integrated nested Laplace approximation,
 - see* INLA
- inverse gamma distribution, 31, 226
- JAGS, 181
 - BOA, 210
 - CODA, 210
- Laplace approximation, 154
 - complete, 163
 - simplified, 163
- latent Gaussian models, 150, 159
- leaving-one-out cross-validation, 73
- LGM, *see* latent Gaussian models
- likelihood principle, 27
- linear regression, 42, 124, 143
- log pseudo-marginal likelihood, 73
- LPML, *see* log pseudo-marginal likelihood
- marginal distribution
 - importance sampling estimate, 57
- Markov chain
 - aperiodic, 93
 - definition, 91
 - ergodic, 93
 - homogeneous, 91
 - irreducible, 92
 - Metropolis–Hastings, *see*
 - Metropolis–Hastings
 - positive recurrent, 92
 - reversible, 93
- Markov chain Monte Carlo
 - data augmentation, *see* data augmentation
 - Gibbs sampler, *see* Gibbs sampler
 - Hamiltonian, 107
 - missing data, 118
 - reversible jump, 138, 148
- MCMC, *see* Markov chain Monte Carlo, 90
- measures of discrepancy, 74
- Metropolis–Hastings, 94
 - independence chain, 97
 - random walk proposal, 97
- mixture model, 120, 144
 - multivariate, 146
- Monte Carlo
 - consensus, *see* consensus Monte Carlo
 - importance sampling, 52
 - marginal distribution, 49
 - method of Chib, 129
 - simple, 44
- multinomial distribution, 36, 227
- multinomial-Dirichlet distribution, 227
- multivariate normal/Wishart distribution, 228
- NDLM, *see* normal dynamic linear model
- negative binomial distribution, 224
- normal distribution, 226
 - multivariate, 228
 - two samples, 33
 - unknown mean, 25
 - unknown mean and variance, 31
 - unknown variance, 31
- normal dynamic linear model, 59
- normal/inverse gamma distribution, 226
- Occam's razor, 81
- OpenBUGS, 174
- p*-value
 - Bayesian, 81
- Pareto distribution, 41, 227
- particle filter
 - adapted, 62
 - auxiliary, 61
 - parameter learning, 63
- Poisson distribution, 30, 40, 225
- Poisson-gamma distribution, 225
- posterior approximation
 - multivariate normal, 151
- posterior distribution, 7
 - marginal, 8
- posterior plausibility, 12
- posterior predictive distribution, 85
- predictive distribution
 - posterior, 13, 71
 - prior, 7
- prior
 - conjugate, 23
 - Jeffreys, 19, 31, 33
 - maximum entropy, 21
 - non-informative, 18

- probability
 - frequentist, 3
 - subjective, 6
- probit regression, 119
- pseudo-Bayes factor, 82
- pseudo-prior, 136
 - metropolized, 137
- R-INLA, 214
- Rao–Blackwellization, 50
- Rayleigh distribution, 41, 226
- repeated sampling, 3
- slice sampler, 105
- Stan, 185
 - BOA, 211
 - CODA, 211
- state space model, 60
- stationary distribution, 92
- Student t distribution, 66, 226
 - multivariate, 228
- t distribution, *see* Student t distribution
- transition function, 91
- uniform distribution, 41, 225
- variable selection
 - Bayesian lasso, 134
 - Dirichlet–Laplace, 134
 - horseshoe, 134
 - MC³, 133
 - SSVS, 131, 143
- variational Bayes, 164
 - Stan, 223
- variational family, 164
- variational inference, 164
 - mean-field, 164
- Weibull distribution, 226
- WinBUGS, 174
 - BOA, 203
 - CODA, 203
- Wishart distribution, 228