

Subject Index

χ^2 distribution, 163, 192

additive model, 150, 165

additivity, 151

AIC, 10

 knot selection, 86, 87, 130

backfitting algorithm, 155, 158, 190

balance test, 230, 233

bandwidth, 31, 41

basis, 74–75

 cubic, 78

Bayesian estimation, 221

BC_a confidence intervals, 241, 250

best linear unbiased predictor, 100

bias-corrected, accelerated

 confidence intervals, *see*

BC_a confidence intervals

bias-variance tradeoff, 46, 145

binning, 23

BLUP, 100

bootstrap, 236

 confidence intervals, 240

 nonlinearity tests, 254

nonparametric regression, 251

 pairs, 247

 regression models, 246

 residuals, 247

 standard error, 239

causal inference, 227

confidence bands, 129, 137, 160,
 191

 Bayesian, 107, 125, 223

 bias-adjusted, 107

 local polynomial regression,
 55

 loess, 55

 lowess, 55

 splines, 106

Cox model, 208

Cox regression, *see* Cox model

cross-validation (CV), 118, 124

curse of dimensionality, 65, 151

degrees of freedom

 residual, 161, 192

density plot, 201

derivative plot, 111

diagnostic plots, 142

- examples
 - congressional elections, 24, 42, 49, 60, 81, 95, 109, 120, 127, 136, 165, 170, 173, 225, 252
 - deforestation, 143
 - democratic peace, 193
 - domestic violence, 197
 - educational outcomes, 219
 - feminist attitudes, 175
 - palm beach returns, 137
 - presidential campaign visits, 232
 - presidential elections, 248
 - racial riots, 209
 - returns to schooling, 230
 - Supreme Court, 203
- experiments, 227
- F-test, 146, 160, 162
- focal point, 23
- functional form, 2, 11, 228
- generalized additive mixed model (GAMM), 218
- generalized additive model (GAM), 14–16, 185, 187–192, 205, 210, 229, 230, 233
- generalized cross-validation (GCV), 119, 125, 165, 256
- generalized linear model (GLM), 2, 185–188
- global estimate, 11
- hat matrix, 56
- hierarchical linear model, *see* mixed model
- hypothesis test, 162
- hypothesis tests, 191
- local polynomial regression, 58
- loess, 58
- lowess, 58
- splines, 110
- interaction, 64, 154, 173, 175, 220
- iterated re-weighted least squares (IRLS), 189, 190, 226
- jackknife, 238
- kernel, 31
 - box, 32
 - normal, 32
 - tricube, 32, 41
 - weights, 40, 51
- knots, 70, 71, 85
 - placement, 85
 - selection, 85, 87, 96
- likelihood ratio test, 160, 163, 168, 191, 196, 201, 207, 210, 220, 230, 255
- link function, 3, 186
- local estimation, 12
- local polynomial regression, 38, 41
- loess, 38–43, 45, 114
- logarithmic transformation, 137, 168, 200
- logistic regression, 141, 194, 229
- lowess, 38–43, 45, 46, 49, 53, 114, 133
- Markov Chain Monte Carlo, 104, 222
- matching, 228
- matrix square root, 94
- MCMC, 104, 222, 226
- mixed model, 216
- mixed models, splines as, 98, 124

- moving average smoother, 22, 27
- multilevel model, *see* mixed model
- negative binomial model, 208
- Newton-Raphson, 189
- nonparametric regression, 12
 - multiple, 63
- nonproportional hazards, 209
- normal-theory confidence intervals, 240
- ordinal logistic regression, 197
- ordinary least squares (OLS), 71
- overdispersion, 208
- overfitting, 15, 46, 53, 85, 90, 129, 136, 179, 260
- ovesmoothing, 48
- partial regression function, 155
- percentile confidence intervals, 240
- poisson regression, 203
- posterior distribution, 222
- prediction, 75
- prior distribution, 222, 225
- propensity score, 229
- proportional hazards model, *see* Cox model
- Q-Q plot, 245, 249
- quadratic transformation, 8, 168, 187, 198, 207
- random effect, 98, 217, 223
- regression
 - nonparametric, 12
 - polynomial, 40, 51, 78
- resample, 237, 239
- residual sum of squares (RSS), 157
- restricted maximum likelihood, 99
- roughness penalty, 92
- semiparametric regression, 14, 153, 159, 167, 178
 - Bayesian, 223
- smoother
 - degrees of freedom, 57, 93, 95
 - matrix, 160
- smoothing parameter, 92
 - automatic selection, 123, 145
- smoothing splines, 91
- software, 261
 - Stata, 261
 - WinBUGS, 224, 225
 - R, 230, 262
- span, 41, 46–49
- spline, 70, 114, 171
 - smoothing, 91
 - B, 83, 87, 130
 - cubic, 79
 - natural, 83, 87
 - smoothing, 91, 131, 142, 165, 178, 230, 236, 256
 - thin plate, 104, 224
- survival model, *see* Cox model
- transformations, 8, 169
 - power, 8
- undersmoothing, 48
- variance-covariance matrix, 160

