

---

## Example index

- $2 \times 2$  table, 23, 46, 49, 172
- Daphnia magna* data, 66
- air-conditioning data, 121, 123
- analgesic data, 129
- astronomer data, 23
- autoregression, 117
- Bernoulli data, 38
- binomial data 63, 23
- blood plasma data, 108
- calibration, 108
- Cauchy distribution, 17
- cell phone data, 46
- constructed exponential family, 129
- coronary heart disease data, 191
- cot death data, 188
- crying babies data, 172
- dental status data, 193
- exponential distribution, 8, 28
- failure time data, 78, 81, 121, 123, 127
- gamma distribution, 13
- generalized linear model, 78, 86
- genetic linkage data, 142
- grazing data, 91
- haemophiliac data, 187
- herbicide data, 96
- heteroscedasticity, 117
- hierarchical model, 123
- house price data, 193
- Laplace approximation, 123
- leukaemia data, 78
- linear model, 61
- log-linear model, 52
- log-normal distribution, 28
- logistic regression, 39, 91
- maize data, 194
- manufacturing process data, 192
- market return data, 117
- multinomial distribution, 142
- myeloma data, 49
- nonlinear model, 66, 72, 96
- nuclear power station data, 61
- paper helicopter, 197
- partial likelihood, 127
- permutation test, 129
- PET film data, 81
- Poisson distribution, 20, 52, 55, 129
- proportional hazards model, 127
- prostate cancer data, 188
- radioimmunoassay data, 72
- smoking data, 55
- speed limit data, 52
- temperature data, 197
- top quark data, 20
- urine data, 39
- vaccine trial data, 188
- variance components, 111
- vector interest parameter, 121
- voltage regulator data, 111
- wasp data, 86

Cambridge University Press

978-0-521-84703-2 - Applied Asymptotics Case Studies in Small-Sample Statistics

A. R. Brazzale, A. C. Davison and N. Reid

Index

[More information](#)


---

## Name index

- Abe, F., 20  
 Agresti, A., 36, 191  
 Aitchison, J., 109  
 Andersen, P. K., 133  
 Andrews, D. F., 40, 184  
 Annis, D. H., 197, 198  
 Aubin, E. C. Q., 132
- Bacher, S., viii, 86  
 Barber, J., 28  
 Barndorff-Nielsen, O. E., 4, 16, 35, 57, 167, 168, 184, 186, 190, 195, 206, 217, 218  
 Bartlett, M. S., 132, 169  
 Bates, D. M., viii, 85  
 Becker, R. A., 184  
 Becker-van Slooten, K., 66, 107  
 Behra, R., 66, 107  
 Belanger, B. A., 72, 73  
 Bellio, R., viii, 4, 85, 107, 109–111, 132, 168, 184, 196, 200, 203  
 Berger, J. O., 168, 209  
 Berkson, J., 201  
 Besag, J. E., 57  
 Bickel, P. J., 107, 169  
 Bohning, D., 193  
 Booth, J. G., 129, 132, 133, 204, 207  
 Borgan, Ø., 133  
 Bowman, K. O., 167  
 Box, G. E. P., 132, 197, 198, 201  
 Brain, P., 107  
 Brazzale, A. R., 4, 16, 57, 66, 85, 107, 168, 184, 203  
 Brown, L. D., 36, 167, 187  
 Butler, R. W., 35, 129, 132, 133, 168, 204, 207, 218
- Cai, T., 36, 187  
 Carroll, R. J., 85, 107, 198, 199  
 Catalan, J., 28
- Chamberlin, S. R., 186  
 Chambers, J. R., 184  
 Chinn, N. M., 188  
 Christensen, O. F., 132  
 Chèvre, N., viii, 66, 67, 107  
 Clifford, P., 57  
 Cook, R. D., 132, 200  
 Cordeiro, G. M., 132, 169, 209  
 Coull, B. A., 36  
 Cousens, R., 107  
 Cousins, R. D., 35  
 Cox, D. R., viii, 4, 16, 57, 61, 62, 78, 79, 107, 111, 112, 121–123, 132, 133, 167, 169, 172, 184–186, 190, 192, 193, 196–198, 201, 206, 209, 217, 218  
 Cribari-Neto, F., 132, 168, 169  
 Curnow, R. N., 200  
 Currie, I. D., 184
- Daniels, H. E., 167, 217  
 DasGupta, A., 36, 187  
 Davidian, M., 72, 73  
 Davidson, K., 29  
 Davis, M., 188  
 Davison, A. C., 4, 36, 57, 81, 82, 84, 85, 107, 129, 132, 133, 168, 180, 184, 193, 203, 206  
 Dear, K. G. B., 50  
 Del Castillo, J., 168, 193  
 Deng, D., 193  
 Dent, J., 28  
 DiCiccio, T. J., 36, 84, 85, 133, 168, 169, 189, 190, 195, 206, 210  
 Dietz, E., 193  
 Dunsmore, I. R., 109  
 Durbin, J., 167
- Efron, B., 16, 36, 167, 205  
 Eno, D. R., 109–111, 132  
 Evans, R., 29

Cambridge University Press

978-0-521-84703-2 - Applied Asymptotics Case Studies in Small-Sample Statistics

A. R. Brazzale, A. C. Davison and N. Reid

Index

[More information](#)*Name index*

231

- Faddy, M. J., 106  
 Feigl, P., 79  
 Feldman, G. J., 35  
 Ferrari, S. L. P., 132, 168  
 Field, C. A., 84, 85, 168, 184, 195, 206, 218  
 Firth, D., 167, 187  
 Fisher, L. D., 188  
 Fisher, R. A., 2, 84, 141  
 Fleming, T. R., 133  
 Forster, J. J., 57  
 Fraser, D. A. S., viii, 16, 35, 84, 85, 107, 167, 168, 186, 193, 195, 206–208  
 Freléchoux, F., 91  
 Frome, E. L., 56  
 Frydenberg, M., 107, 132  
  
 Ghosh, J. K., 107, 169  
 Gill, R. D., 133  
 Giltinan, D. M., 72, 73  
 Grambsch, P. M., 133  
 Gravenor, M. B., 200  
 Guettinger, H., 66, 107  
 Guolo, A., 203  
 Guoying, L., 191  
  
 Hampel, F. R., 179  
 Harrington, D. P., 133  
 Herzberg, A. M., 40  
 Hinkley, D. V., 16, 36, 57, 81, 82, 85, 107, 129, 132, 167, 180, 185, 205  
 Hirose, H., 82  
 Hosmer, D. W., 191  
 Hothorn, T., viii  
 Hurvich, C. M., 85, 195  
 Huzurbazar, S., 129, 133, 204, 207  
  
 Iglesias-Gonzalez, S., 168  
  
 Jensen, J. E., 85, 107  
 Jensen, J. L., 107, 132, 218  
 Jiang, G., 189  
 Jiang, L., 188  
 Jie, Y., 191  
 Jørgensen, B., 57  
  
 Kabaila, P., 184  
 Kadane, J. B., 168, 210  
 Kappel, D., 96, 103, 107  
 Keiding, N., 133  
 Kendall, W. S., 184  
 Klein, J. P., 133  
  
 Knight, K., 185  
 Kolassa, J. E., 219  
 Krog-Josiassen, M., 203  
  
 Laird, N. M., 50  
 Lange, K. L., 84  
 Lawless, J. F., 85, 195  
 Lawley, D. N., 169  
 Lee, S. M. S., 36, 190  
 Lehmann, E. L., 132, 185  
 Lemeshow, S., 191  
 Lepine, D., 188  
 Liang, K.-Y., 167  
 Lipsitz, S. R., 50  
 Little, R. J. A., 35, 84  
 López-Ratera, A., 168, 193  
 Liu, Y., 184  
 Lucambio, F., 132, 168  
 Lugannani, R., 217  
 Lyons, B., 132, 203  
  
 Mandelkern, M., 35  
 Martin, M. A., 133, 168, 169, 189, 190  
 McCullagh, P., 57, 107, 167, 169, 184, 209, 210, 217  
 McDonald, J. W., 57  
 McQuarrie, A. D. R., 85  
 Min, Y., 191  
 Moeschberger, M. L., 133  
 Molenberghs, G., 50  
  
 Nelder, J. A., 57, 107, 169  
 Neumann, P., 188  
 Ng, K., 189  
  
 O'Shaughnessy, M., 188  
 Oakes, D., 133  
  
 Pace, L., 4, 132, 167, 185  
 Paul, S. R., 193  
 Pedersen, J. G., 132  
 Peers, H. W., 168  
 Peters, D., 16, 132, 168, 203, 207  
 Peterson, D. R., 188  
 Petrie, A., 130, 132  
 Pierce, D. A., 16, 168, 207  
  
 Qin, G., 187, 188  
  
 R Development Core Team, viii, 184  
 Rao, C. R., 142  
 Rawlings, J. O., 180  
 Redelmeier, D. A., 46, 47, 57, 192  
 Reid, N., 4, 35, 107, 167, 168, 190, 193, 206–208, 210, 217

Cambridge University Press

978-0-521-84703-2 - Applied Asymptotics Case Studies in Small-Sample Statistics

A. R. Brazzale, A. C. Davison and N. Reid

Index

[More information](#)

232

*Name index*

- Remis, R., 188  
 Rice, S., 217  
 Ridout, M. S., 106, 107, 200  
 Ronchetti, E. M., 179, 218  
 Rose, C., 184  
 Rousseeuw, P. J., 179  
 Rudemo, M., 107, 201  
 Ruppert, D., 85, 107, 198, 199, 201
- Salvan, A., viii, 4, 132, 167, 185, 203  
 Sartori, N., 168  
 Schlattman, P., 193  
 Schmidt, U., 29  
 Seber, G. A. F., 85  
 Seiden, P., 85, 96, 97, 103, 107  
 Self, S. G., 167  
 Sen, A., 193  
 Severini, T. A., 4, 35, 167, 168, 185, 206  
 Shenton, L. R., 167  
 Simonoff, J. S., 118, 120, 132  
 Skovgaard, I. M., 4, 85, 153, 166–169, 184, 209, 217  
 Smith, M. D., 184  
 Smith, P. W. F., 57  
 Snell, E. J., 4, 16, 57, 61, 62, 78, 79, 111, 112, 121–123, 167, 192, 196, 197  
 Solomon, M. G., 106  
 Solomon, P. J., 132  
 Srivastava, M., 193  
 Stafford, J. E., 184  
 Stahel, W. A., 179  
 Staicu, A.-M., viii, 169  
 Stallard, N., 200  
 Stern, S. E., 168, 169, 190, 210  
 Streibig, J. C., 96, 97, 103, 107, 201  
 Sun, X., 189  
 Svensson, A., 53  
 Sweeting, T. J., 169, 191
- Tarradellas, J., 66, 107  
 Tata, P., 29  
 Taylor, J. M. G., 84  
 Tempany, C. M., 188  
 Therneau, T. M., 133  
 Thompson, S., 29  
 Tian, L., 189  
 Tibshirani, R. J., 36, 46, 47, 57, 168, 192  
 Tierney, L., 168, 210  
 Tsai, C.-L., 85, 118, 120, 132, 195  
 Tsao, M., 187, 188  
 Tschanz, B., 86  
 Tsoukas, C., 188  
 Tyrer, P., 29
- Uusipaikka, E., 184
- Vandenbergh, C., viii, 91
- Wald, A., 185  
 Wang, S., 168  
 Watts, D. G., 85  
 Weisberg, S., 132, 200  
 Welsh, A. H., 184  
 Wermuth, N., 4  
 Wild, C. J., 85  
 Wilding, G. E., 189  
 Wilks, A. R., 184  
 Wong, A. C. M., 35, 84, 85, 167, 188, 189, 207  
 Wu, J., 84, 85, 167, 184, 189, 208
- Yates, F., 35  
 Yi, G. Y., 184  
 Young, G. A., 36, 190  
 Yubin, T., 191
- Zelen, M., 79  
 Zhou, X.-H., 187, 188

Cambridge University Press

978-0-521-84703-2 - Applied Asymptotics Case Studies in Small-Sample Statistics

A. R. Brazzale, A. C. Davison and N. Reid

Index

[More information](#)


---

## Index

- $2 \times 2$  table, 35  
*M*-estimator, 219  
 $\chi^2$  approximation, 218–219  
 $o$ ,  $O$ ,  $o_p$ ,  $O_p$  notation, 212  
 $p^*$  approximation, 140–141, 162, 167, 168, 205, 206  
 $r^*$  approximation, 30  
*P*-value, 6, 21  
*cond*, 14, 16, 25, 37, 39, 42, 57, 90, 93, 130, 149, 153, 154, 156, 191, 192  
*hoa*, 4, 14, 16, 42, 59, 61, 86, 149, 153, 154, 156, 161, 166, 170, 174, 184, 194  
*marg*, 14, 16, 61, 81, 84, 149, 153, 154, 158, 175, 193, 195  
*nlreg*, 59, 86, 96, 97, 100, 153, 161, 166, 176, 196, 198  
*fraser.reid*, 182  
*lik.ci*, 183  
*plot.fr*, 183  
  
 affine invariance, 15, 186  
 AIC, 61, 85, 194  
 AIC<sub>c</sub>, 61, 85, 194  
 analysis of variance, 111  
     multivariate, 204  
 ancillary directions, 144, 153, 167, 196  
 ancillary statistic, 15, 58, 78, 85, 140, 142, 145, 153, 157, 158, 167, 205, 206  
 autoregression, 117, 120  
  
 Barndorff-Nielsen approximation, 147, 156, 158, 164, 167, 216, 219  
 Bartlett correction, 7, 8, 93, 107, 121, 122, 132, 149, 164–166, 169, 206, 209, 210  
     empirical, 96  
 Bartlett identities, 135  
 Bartlett–Nanda–Pillai trace statistic, 204  
 Bayesian inference, 15, 44, 59, 110, 123, 132, 161–164, 168, 187, 191, 209  
     first order, 162  
  
 bootstrap, 33, 36, 129, 190  
     Bayesian, 133  
     non-parametric, 70, 132  
     parametric, 75, 83, 93, 107, 122, 166  
 bovine spongiform encephalopathy, 200  
 Box–Cox transformation, 198, 201  
  
 calcium uptake data, 180  
 calibration, 132  
 case-crossover study, 47  
 cell phone data, 57  
 censored data, 133  
 censoring, 188  
     right, 127  
     Type I, 133  
     Type II, 60, 79, 81, 85, 133  
 central limit theorem, 213  
 cheese, highest, 20  
 coefficient of variation, 189  
 components of variance, 202  
 computer algebra, 170  
 conditional density, 94  
 conditional inference, 35, 107  
 confidence interval, 6  
     highest density, 188  
 configuration, 58, 78, 142  
 continuity correction, 21, 154, 168, 187, 191  
 contour plot, 60, 73  
 convergence, 212  
     in distribution, 138  
     in probability, 162  
 Cook’s distance, 100, 200  
 correlation, 189  
 covariance matrix, 132  
 crying babies data, 175  
 cumulant, 213  
 cumulant generating function, 210, 212  
 curvature, 74  
 cut, 57

deviance, 89  
 digamma function, 8, 13, 122  
 directed likelihood ratio statistic, *see* likelihood root  
 discrete data, 15, 36, 37, 107, 154–155, 168, 206  
 distribution  
   Bernoulli, 23, 38, 39, 46, 47, 89, 90, 192, 199  
   binomial, 23, 36, 37, 49, 52, 172, 177, 187, 191, 199  
   bivariate normal, 189  
   Cauchy, 17, 35, 205  
   chi-squared, 113, 204  
   exponential, 8, 28, 123, 128, 178, 188, 189  
   extreme-value, 78, 178  
    $F$ , 28, 116, 188  
   gamma, 13, 60, 89, 121, 132, 133, 145, 189  
   Huber's least favourable, 178  
   hypergeometric, 24  
   inverse Gaussian, 185, 189  
   log-gamma, 186  
   log-logistic, 60  
   log-normal, 28, 30, 60, 189, 198  
   log-Weibull, 178  
   logistic, 45, 178, 186  
   multinomial, 129, 142  
   non-central chi-squared, 113  
   normal, 58, 61, 66, 72, 108, 111, 117, 186, 189, 194, 196  
   Poisson, 20, 35, 37, 52, 55, 129, 187, 192  
   Rayleigh, 178  
   Student  $t$ , 61, 84, 178, 193, 194  
   Weibull, 60, 78, 81, 189  
   Wishart, 204  
 distribution function approximation, 215–217  
 ED<sub>50</sub>, 96, 104  
 Edgeworth expansion, 2, 167, 184, 187, 209, 210, 213–214, 218  
 effect dose (ED<sub>p</sub>), 104  
 EM algorithm, 54  
 equivariant estimator, 195  
 estimating equation, 132  
 exact test, 38, 94  
   Monte Carlo, 95  
 examples *see* example index  
 exchangeability, 125  
 exponential family, 20, 24, 28, 29, 31, 37, 50, 117, 123, 137, 145, 150, 167  
   canonical parameter, 11  
   constructed, 129  
   curved, 14, 90, 137, 141, 142, 160, 189, 196, 206  
   empirical, 133

full, 137, 141, 142, 163, 186, 189, 190, 196, 205, 209  
 linear, 11, 14, 37, 41, 57, 109, 155–156, 167, 171, 184, 204, 206, 207  
 natural observation, 11  
 tangent, 14, 137, 141–144, 149, 152, 154, 159, 167, 168, 182, 199, 205, 206  
 failure time data, 60, 78, 81, 127, 133, 188  
 family object, 177–180  
 first order inference, 1, 138–140, 185  
   vector parameter, 139  
 Fisher information, 205  
   expected, 135, 136, 139, 167, 205  
   observed, 5, 135, 136, 139, 141, 167, 205  
   profile, 136, 173  
 generalized linear model, 14, 57, 89, 107, 137, 169, 173, 177, 184, 199, 209  
   mixed, 203  
 heteroscedasticity, 117, 132, 172, 176, 180, 196, 198, 205  
   score test, 132  
 hierarchical model, 123  
 higher order inference, 1, 6, 140–146  
   smoothing effect, 39  
 hormesis, 69, 97  
 Hubble Space Telescope, 23  
 influence, 200  
 interest parameter, 10, 136  
   implicit, 152  
   vector, 164–166, 168, 169  
 kurtosis, 213  
 Lagrange multiplier, 152  
 Laplace approximation, 54, 126, 132, 162, 168, 210, 217–219  
 LD<sub>50</sub>, 105  
 leverage, 100  
 likelihood, 134  
   adjusted profile, 12, 76, 133, 154, 168  
   conditional, 12, 24, 25, 38, 48, 57, 192, 204  
   log, 135  
   marginal, 12, 113, 203  
   modified profile, 132, 153, 158, 168, 175  
   non-regular, 84, 97, 167, 168  
   partial, 127  
   profile, 10, 25, 76, 136, 168, 175, 204  
   restricted, 202  
 likelihood ratio statistic, 6, 11, 164, 169  
   asymptotic distribution, 138

- likelihood root, 5, 11, 139, 187, 206  
 modified, 6, 11, 171, 173, 187  
 decomposition of, 12, 42, 97, 155
- linear model, 2, 58, 61, 84, 108, 117, 156–158, 184, 193, 194, 196, 206, 207  
 heteroscedastic, 117, 132  
 mixed, 132, 202, 203  
 non-normal, 163, 171, 175  
 normal, 58, 59, 108, 111, 168, 208
- link function, 89, 107, 199
- location model, 17, 138, 141, 142, 150, 186, 205
- location-scale model, 84, 138, 145, 168, 207
- log-linear model, 37, 54, 177
- logistic regression, 37, 39, 54, 57, 90, 93, 94, 172, 177, 191
- logistic response function, 96, 107
- Lugannani–Rice approximation, 7, 18, 30, 147, 156, 164, 216, 218, 219
- marginal inference, 59
- Markov chain Monte Carlo, 54, 57, 132
- matched pairs, 47, 52, 172, 192
- maximum likelihood estimator, 5, 135, 205  
 asymptotic distribution, 138  
 consistency, 138, 185  
 constrained, 10, 74, 136  
 density approximation, 140
- measurement error, 100, 201
- Metropolis–Hastings algorithm, 95
- mid-P-value, 21, 26, 35, 154, 187
- model selection, 85
- multivariate analysis, 133
- non-convergence, 38, 39, 89, 93
- nonlinear model, 59, 66, 72, 84, 85, 143, 146, 159–161, 172, 176, 180, 197, 198, 205, 207, 208  
 diagnostics, 99, 100  
 heteroscedastic, 60  
 logistic, 199  
 mixed, 132, 203
- nuisance parameter, 10, 35, 136, 151–154, 168
- numerical instability, 149, 175
- odds, 24, 47, 187
- order statistics, 60
- orthogonal parameters, 12, 74, 164
- outlier, 3, 58, 100, 190, 200
- overdispersion, 193
- parametrization, 167  
 parc jurassien, 91  
 partial likelihood, 133  
 permutation test, 129
- pivot, 7, 8, 144, 145, 153, 167  
 approximate, 7
- pivot profiling, 170, 174–176
- posterior distribution, 209
- power-of-the-mean variance function, 73
- prior distribution, 123  
 Jeffreys, 187  
 matching, 110, 163, 168, 187, 191  
 non-informative, 163
- probability difference, 24, 28, 49, 187
- probability integral transform, 144
- probability ratio, 24, 26, 187
- profile plot, 7, 60, 73
- profile trace, 60, 73
- proportional hazards model, 127, 133
- random effects, 54
- regression-scale model, 14, 138, 168, 177, 195, 206
- regularity conditions, 135
- relative error, 10
- REML, *see* likelihood, restricted
- reparametrization, 136
- residual, 99, 200
- residual sum of squares, 59–61
- robust inference, 184
- saddlepoint approximation, 2, 129, 132, 167, 168, 207, 214, 218, 219  
 double, 133  
 sequential, 133, 207
- sample mean, 212–213
- sample space derivative, 102, 137, 153, 160
- score equation, 135, 151, 205, 206
- score pivot, *see* score statistic
- score statistic, 5, 138, 139, 193
- serial dependence, 120
- serial dilution assay, 199
- signed likelihood ratio statistic, *see* likelihood root
- significance function, 6, 7
- skewness, 213
- Skovgaard approximation, 70, 73, 85, 100, 102, 121, 123, 160, 166, 168, 184, 196, 200, 203, 208, 209
- spline, 175
- split-plot experiment, 55, 91
- statistical-no-effect dose (SNED), 103, 107
- stress-strength reliability, 188
- sufficient statistic, 137, 141
- summation convention, 165, 210
- symbolic computation, 170, 184
- symbolic differentiation, 180–182

Cambridge University Press

978-0-521-84703-2 - Applied Asymptotics Case Studies in Small-Sample Statistics

A. R. Brazzale, A. C. Davison and N. Reid

Index

[More information](#)

236

tail area approximation, 147–161, 167,  
168  
tangent exponential model, *see* exponential  
family, tangent  
tensor calculus, 184  
time series, 120  
transform-both-sides, 66, 96, 107, 198, 199,  
201  
transformation family, 137, 141, 167  
transformation-invariance, 9  
truncation, 188

variance components, 111, 132

*Index*

variance function, 100, 198  
error-in-variables, 100, 102, 107  
power-of- $x$ , 100, 102, 107, 199  
variance independence, 136  
variance inhomogeneity, *see* heteroscedasticity  
variance parameters, 76  
variance stabilization, 66, 73, 199

Wald pivot, *see* Wald statistic  
Wald statistic, 5, 11, 36, 75, 152, 187, 205

zero inflated distribution, 192