Likelihood and Bayesian Asymptotics: Running list of references

January 11/96

Barndorff-Nielsen, O.E. and Cox, D.R. (1989). *Asymptotic techniques for use in statistics.* Chapter 2. Chapman and Hall, London.

First order theory for likelihood based quantities, delta method and Slutsky's theorem.

Cox, D.R. and Hinkley, D.V. (1974). *Theoretical statistics.* Ch. 9. Chapman and Hall, London.

First order theory for likelihood based quantities, with and without nuisance parameters.

January 18/96

Lehmann, E.L. (1986). *Theory of point estimation.* Ch. 6 J. Wiley & Sons, New York.

Asymptotic consistency and normality of the m.l.e., using a 'stochastic Taylor series' argument. Good discussion of conditions.

Berger, J.O. (1985). *Statistical decision theory and Bayesian analysis.* Ch. 4 Springer-Verlag, New York.

Sketch of asymptotic normality of posterior.

Reid, N. (1996). Asymptotic expansions. to appear in *Encyclopedia of Statistical Sciences, Update Volume.* on my web page.

January 25/96

Walker, A.M. (1969) On the asymptotic behaviour of posterior distributions. *J. R. Statist. Soc.* B **31**, 30–88.

Detailed proof of asymptotic normality of posterior.

Fraser, D.A.S. and McDunnough, P. (1984). Further remarks on asymptotic normality of likelihood and conditional analyses. *Canad. J. Statist.* **12**, 183–190.

Brenner, D., Fraser, D.A.S. and McDunnough, P. (1982). On asymptotic normality of likelihood and conditional analysis. *Canad. J. Statist.* **10**, 163–172.

These papers generalize Walker's result to improper priors, and simplify the proof.

February 1/96

Barndorff-Nielsen, O.E. and Cox, D.R. (1989). *Asymptotic techniques for use in statistics.* Chapter 4. Chapman and Hall, London.

My derivation of the Edgeworth expansion and the saddlepoint expansion follows this fairly closely.

Kolassa, J.E. (1994). *Series approximation methods in statistics.* Springer-Verlag, New York.

Provides a very detailed derivation of the Edgeworth and saddlepoint expansions for the density and distribution function of the sample mean.

McCullagh, P. (1987). *Tensor methods in statistics.* Chapter 6. Chapman and Hall, London.

Multivariate version of Edgeworth expansion.

Stuart, A. and Ord, K. (1987). *Kendall's advanced theory of statistics, Volume 1.* Chs. 3 and 6.

The source for everything you ever want to know about cumulants and moments for scalar random variables, in Ch. 3; Edgeworth expansion in detail in Ch. 6.

Feller, W. (1971). *An introduction to probability theory and its applications.* Volume 2, Ch. 16. J. Wiley & Sons, New York.

Clear and careful proof of the Edgeworth expansion.

February 8/96

Barndorff-Nielsen, O.E. (1980). Conditionality resolutions. *Biometrika* **67**, 293–310.

Contains proof of exactness of p^* in transformation models.

Johnson, R.A. (1970). Asymptotic expansions associated with posterior distributions. *Ann. Math. Statist.* **41**, 851–864.

Edgeworth expansion for the posterior cdf, in detail.

Reid, N. (1988). Saddlepoint methods and statistical inference. (with discussion). *Statist. Science* **3**, 213–238.

A review of the p^* formula, in exponential and transformation families, and the relationship to the saddlepoint approximation.

Skovgaard, I.M (1981a). Transformation of an Edgeworth expansion by a sequence of smooth functions. *Scand. J. Statist.* **8**, 207–217.

Skovgaard, I.M. (1981b). Edgeworth expansions of the distributions of maximum likelihood estimators in the general (non i.i.d.) case. *Scand. J. Statist.* **8**, 227–236.

These papers give a careful outline of the use of the Edgeworth expansion for the sample mean to derive an Edgeworth expansion for a smooth function of a sample mean.

Skovgaard, I.M. (1990). On the density of minimum contrast estimators. *Ann. Statist.* **18**, 779–789.

Beautifully written, includes a proof of the p^* formula in Section 3.

February 15/96

Barndorff-Nielsen, O.E. and Cox, D.R. (1989). *Asymptotic techniques for use in statistics.* Chapter 3. Chapman and Hall, London.

Laplace's method for approximating integrals.

Tierney, L.J. and Kadane, J.B. (1986). Accurate approximations for posterior moments and marginal densities. *J. Am. Statist. Assoc.* **81**, 82–86.

February 29/96

Barndorff-Nielsen, O.E. (1990). Approximate interval probabilities. *J. R. Statist. Soc.* B **52**, 485–496.

Derivation of scalar parameter tail area approximation in the r^* form.

Fraser, D.A.S. (1991). Statistical inference: likelihood to significance. *J. Am. Statist. Assoc.* **86**, 258–265.

Scalar parameter tail area approximation and a discussion of the confidence distribution function, or significance function.

Fraser, D.A.S. (1990). Tail probabilities from observed likelihoods. *Biometrika* **77**, 65–76.

Derivation of scalar parameter tail area approximation in the Lugannani and Rice form. Lots of numerical examples.

Reid, N. (1996). Higher order asymptotics and likelihood: a review. *Canad. J. Statist.* , to appear.

Review of tail area approximations, scalar and nuisance parameter cases. Annotated bibliography. On my web page.

March 7 and 14/96

Reid, N. (1996). (see above)

DiCiccio, T.J., Field, C.A. and Fraser, D.A.S. (1990). Approximations of marginal tail probabilities and inference for scalar parameters. *Biometrika* **77**, 77–95.

Derivation of tail area approximation with nuisance parameters in transformation (location-scale) models.

Fraser, D.A.S., Reid, N. and Wong, A. (1991). Exponential linear models: a two-pass procedure for saddlepoint approximation. *J. R. Statist. Soc.* B **53**, 483–492.

Derivation of tail area approximation for conditional inference in exponential families.

Pierce, D.A. and Peters, D. (1992). Practical use of higher order asymptotics for multiparameter exponential families (with discussion). *J. R. Statist. Soc.* B **54**, 701–738.

Review of r^* in exponential families, with detailed numerical work.

DiCiccio, T.J. and Martin, M.A. (1991). Approximations of marginal tail probabilities for a class of smooth functions with applications to Bayesian and conditional inference. *Biometrika* **78**, 891–902.

Applies the tail area approximation of DFF90 to the Laplace approximation for the marginal posterior of a nonlinear function. The latter extends Tierney and Kadane (1986) and is derived in TKK89. Section 4 gives an application to conditional inference in exponential families.

DiCiccio, T.J. and Martin, M.A. (1993). Simple modifications for signed roots of likelihood ratio statistics. *J. R. Statist. Soc.* B **55**, 305–316.

See annotation in Reid96.

Tierney, L.J., Kass, R.E. and Kadane, J.B. (1989). Approximation of marginal densities of nonlinear functions. *Biometrika* **76**, 425–433. with correction (1991) *Biometrika* **78**, 233–4.

March 28/96

Cox, D.R. and Hinkley, D.V. (1974). *Theoretical statistics.* Chapter 9.3. Chapman and Hall, London.

Serfling, R.J. (1980). *Approximation theorems of mathematical statistics.* Chapter 4.4.4. J. Wiley & Sons, New York.

First order theory for log-likelihood ratio statistics.

Lawley, D.N. (1956). A general method for approximating to the distribution of the likelihood ratio criteria. *Biometrika* **43**, 295–303.

The original and most impressive paper on Bartlett correction.

McCullagh, P. (1987) *Tensor methods in statistics.* Chapter 7?.

Derivation of Bartlett factor (no nuisance parameters) along the lines of my outline for scalar parameters done in class, but in the multiparameter setting. Follows Lawley.

Barndorff-Nielsen, O.E. and Cox, D.R. (1994). *Inference and asymptotics.* Chapter 4.4 and 6.5.

Derivation of Bartlett correction from p^* formula.

DiCiccio, T.J. and Stern, S.E. (1993). On Bartlett adjustments for approximate Bayesian inference. *Biometrika* **80**, 731–740.

Derivation of Bayesian Bartlett correction by brute force, starting from the Laplace approximation to the marginal posterior.

Bickel, P.J. and Ghosh, J.K. (1990). A decomposition for the likelihood ratio statistic and the Bartlett correction – a Bayesian argument. *Ann. Statist.* **18**, 1070–1090.

A beautiful paper that I don't understand, with a careful derivation of the Bartlett correction for the posterior log-likelihood ratio statistic, and the use of an 'unsmoothing' argument due to Stein and to Ghosh, also outlined in Dawid (1991, JRSSB), to obtain the frequentist Bartlett correction result. Does not give an explicit form for the Bartlett factor, but this is available for the Bayesian case in DS93 and for the frequentist case in BNC94, Ch.6.

April 4/96

Welch, B.L. and Peers, H.W. (1963). On formulae for confidence points based on integrals of weighted likelihoods. *J. R. Statist. Soc.* B **25**, 318–329.

Derivation of the Jeffreys' prior as a 'matching' prior, in the sense of giving posterior probability intervals with the correct frequentist coverage, to $O(n^{-1})$, which seems to be the best that can be done using a Bayesian approach. Scalar parameter case only. Expression given for the $O(n^{-1})$ term.

Peers, H.W. (1965). On confidence points and Bayesian probability points in the case of several parameters. *J. R. Statist. Soc. B* **27**, 16–27.

Tibshirani, R. J. (1989). Non-informative priors for one parameter of many. *Biometrika* **76**, 604–608.

Mukerjee, R. & Dey, D. K. (1993) Frequentist validity of posterior quantiles in the presence of a nuisance parameter: Higher order asymptotics. *Biometrika* 499–506.

Reid, N. (1996). Likelihood and Bayesian approximation methods. to appear in proceedings of Valencia 5. On my web page.

Brief review of matching priors in Section 4; lots of references.

Kass, R. E. & Wasserman, L. (1993) Formal rules for selecting prior distributions: a review and annotated bibliography, Technical Report 583, Carnegie-Mellon University.

To appear shortly in *JASA*, I think. Very good review of reference priors.

Berger, J. O. & Bernardo, J. M. (1992*a*) On the development of reference priors(with discussion). *in* J. M. Bernardo, J. O. Berger, A. P. Dawid & A. F. M. Smith, eds, *Bayesian Statistics IV*, Oxford University Press, 35–60.

Berger, J. O. & Bernardo, J. M. (1992*b*) Ordered group reference priors with application to a multinomial problem. *Biometrika* **79**, 25–39.