1992

TWENTY-EIGHTH GREGYNOG STATISTICAL CONFERENCE

PROGRAMME

Friday		
24 April	**13.00**	**Lunch**
	14.15	**Professor Brian Ripley (Oxford)** ***Statistical aspects of neural networks***
	15.45	**Tea**
	16.15	**Professor Roger Mead (Reading)** ***Experimental design, loss of information and practical design***
	19.00	**Dinner**
Saturday		
25th April	**08.30**	**Breakfast**
	09.30	**Dr Trevor Sweeting (Surrey)** ***Some applications of parameter based asymptotics***
	11.00	**Coffee**
	11.30	**Dr Jake Ansell (Edinburgh)** ***Dependency in reliability***
	13.00	**Lunch**

----------AFTERNOON FREE (walks, etc.)----------

	16.00	**Tea**
	17.30	**Professor Tore Schweder (Oslo, visiting Cambridge)** ***Maximum simulated likelihood with applications to whale counting***
	19.00	**Dinner**
Sunday		
26 April	**08.30**	**Breakfast**
	09.30	**Dr David Firth (Southampton)** ***Bias reduction of maximum likelihood estimates***
	11.00	**Coffee**
	11.30	**Mr Andrew Grieve (ICI Pharmaceuticals)** ***Measuring your posterior beliefs that you can count properly***
	13.00	**Lunch**
	14.00	**Professor Peter Lewis (US Naval PG School, Monterey)** ***Non-linear Time Series using Multivariate Adaptive Regression Splines (MARS)***
	15.30	**Tea**

Experimental Design, Loss of Information and Practical Design

R. Mead
University of Reading

Grouping experimental units in sets (blocks) of homogeneous units is essential in planning efficient experiments. Because such a grouping means that not all treatment comparisons are made between similar units within blocks, some information about treatment differences is lost (dispersed). The mechanisms of information loss are different for unstructured and structured treatment sets. The principles for practical construction of designs differ similarly.

Some applications of parameter-based asymptotics

Dr Trevor Sweeting, University of Surrey

Statistical methods based on standard maximum likelihood asymptotics may still be applicable when the usual asymptotic conditions are violated, or when the sample size is not sufficiently large for these conditions to apply. This often occurs because the true parameter value is close to the boundary of the parameter space. Of particular interest are applications to stochastic process models and we shall discuss a specific multiparameter reliability model. An analysis of some associated reliability data will also be presented.

Bias reduction of maximum likelihood estimates

BY DAVID FIRTH

Department of Mathematics, University of Southampton, SO9 5NH, U.K.

SUMMARY

It is shown how, in regular parametric problems, the first-order term is removed from the asymptotic bias of maximum likelihood estimates by a suitable modification of the score function. In exponential families with canonical parametrization the effect is to penalize the likelihood by the Jeffreys invariant prior. In binomial logistic models, Poisson loglinear models and certain other generalized linear models, the penalty can be imposed in standard regression software using a scheme of iterative adjustments to the data. The approach is investigated in some nonstandard examples with many incidental parameters.

Some key words: Asymptotic bias; Biased estimating equations; Exponential family; Jeffreys prior; Logistic regression; Loglinear model; Matched pairs; Neyman-Scott problem; Nuisance parameters; Penalized likelihood; Shrinkage.

Measuring Your Posterior Beliefs That You Can Count Properly.

Andrew P. Grieve

Safety of Medicines Department
ICI Pharmaceuticals

There have been two major inhibitors to the routine use of Bayesian methods in practical applications. The first has been the paucity of computer software capable of evaluating the potentially high-dimensional integrals involved in Bayesian statistics. The second has been the philosophical objections to the use of prior distributions be they uninformative, which are criticised as being unrealistic and arbitrary, or proper which are criticised as being biasing, subjective, anti-objective etc, etc. While the former inhibitor has been tackled, and continues to be tackled, through the provision of appropriate software, the latter inhibitor, particularly when the pharmaceutical industry and regulatory bodies are involved, is more problematic.

In this paper we provide a case study to do with the dosing of dogs in toxicity studies to demonstrate firstly that there exist problems for which the lack of appropriate software should not be an inhibitor to a Bayesian analysis, and secondly that the use of prior distributions can, on occasion, be an absolute necessity rather than being judged as pampering to the theoretical proclivities of whole-heartedly unpractical statisticians. In the main we concentrate on the problem as presented, however we will signpost design issues which potentially, at least, may radically improve the proposed solution.

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Dr Jake Ansell (Edinburgh)
Dr David Firth (Southampton)
Mr Andrew Grieve (ICI Pharmaceuticals) + 3
Professor Peter Lewis (US Naval PG School, Monterey)
Professor Roger Mead (Reading)
Professor Brian Ripley (Oxford) → Sat lunch.
Professor Tore Schweder (Oslo, visiting Cambridge)
Dr Trevor Sweeting (Surrey)

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Mr Cui