Thirty-Fifth Gregynog Statistical Conference Programme

1999

All talks will take place in Seminar Room 1 (Floor 2, far end)

Friday	16.00	*Tea*
16 April	17.00	Professor Gareth Roberts (Lancaster)
		1. Introduction to MCMC.
	19.00	*Dinner*
	20.00	Professor Mike Campbell (Sheffield)
		Methods of analysing clustered randomised controlled trials
Saturday	08.00	*Breakfast*
17 April	09.30	Professor Ilya Molchanov (Glasgow)
		How to Average a Cat and a Dog?
	11.00	*Coffee*
	11.30	Professor Gareth Roberts
		2. Convergence Properties of the Gibbs Sampler.
	13.00	*Lunch*

Afternoon free (walks, etc)

	16.00	*Tea*
	17.30	Professor David Siegmund (Stanford, visiting Cambridge)
		Genetic Linkage Analysis as a Change-point Problem.
	19.00	*Dinner*
Sunday	08.00	*Breakfast*
18 April	09.30	Professor Chris Jennison (Bath)
		Approximate Exact Sampling: Towards the General Application of Propp and Wilson's Algorithm.
	11.00	*Coffee*
	11.30	Professor Gareth Roberts
		3. Langevin Algorithms and Reversible Jump.
	13.00	*Lunch*
	14.00	Professor Tony Lawrance (Birmingham)
		Communication, Chaos and Randomness
	15.30	*Tea and finish.*

Abstracts

Mike Campbell   Sheffield
Methods of analysing clustered randomised controlled trials

Many clinical trials, particularly in general practice, are of the form in which treatments are randomised by health professional but outcome is from individual patients. Ignoring the clustering generated by the health professional can lead to invalid levels of statistical significance. This talk will will discuss the design and analysis of such trials. It will describe a randomised trial of training in a patient centred care approach for the treatment of newly diagnosed non-insulin dependent diabetes compared with current guidelines booklets. Analysis was by unweighted and weighted means, multilevel models using the computer program MLWin (Institute of Education, London) and random effects models in the computer programs STATA and SAS. Issues about the analysis of such trials, and preferences for software will also be discussed

Professor Chris Jennison   Bath
Approximate Exact Sampling: Towards the General Application of Propp and Wilson's Algorithm. (with Tine Moller-Sorensen)

Many proposals have been made for assessing when the Markov chains used in MCMC sampling, have "converged" to their limiting distributions. I shall describe the background to this problem and discuss a couple of existing diagnostic approaches.

Given the difficulty in assessing convergence, it is not surprising that Propp and Wilson's EXACT SAMPLING algorithm was greeted with enthusiasm. I shall explain how this sampling-from-the-past rule works and discuss some practicalities regarding its use in MCMC sampling.

The major drawback with Propp and Wilson's method is that it requires the target distribution to have special properties -- which only hold in special cases. The object of my work with Tine has been to develop a way to use the basic idea underlying Propp and Wilson's method more generally. I shall propose a way of doing this and demonstrate that it works well in some quite challenging applications. Although our method is approximate, it comes with built-in diagnostics which help assess and control the level of approximation.

Professor Tony Lawrance   Birmingham
Communication, Chaos and Randomness

This talk will first indicate how chaos is being used in communications engineering research. In particular, mention will be made of chaotic spreading for carrying bit sequences, and synchronous chaos whereby sender and receiver sequences, although individually chaotic, can be synchronized. Crucially, for security purposes, chaotic dynamical systems are required with good independence properties. This motivates the quest for a notion of deterministic independence and leads to a study of the statistical properties of chaotic map sequences employing and developing the Perron-Frobenius work of Tohru Kohda. The independence aspect is being resolved by a compromise with discreteness. This whole area illustrates how communications research can bring new ideas into statistical chaos and why a thorough understanding of the statistical aspects of chaos is needed in chaos communications research.

Professor Ilya Molchanov   Glasgow
How to Average a Cat and a Dog?
The main aim of the talk is to explain various elementary techniques that involve random sets and can be used to handle samples of images. A particular emphasis is placed on averaging of samples of images, smoothing, thresholding of grey-scale images and digitising of images.

Professor Gareth Roberts   Lancaster
1. Introduction to MCMC
2. Convergence properties of the Gibbs sampler
3. Langevin algorithms and reversible jump

Professor David Siegmund   Stanford, visiting Cambridge
Genetic Linkage Analysis as a Change-point Problem
Linkage analysis has the goal of locating genes associated with particular traits in plants or animals (especially inherited diseases in humans). The associated statistical issues lead to a class of irregular statistical problems, which are structurally almost identical to change-point problems. I will discuss linkage analysis with reference to an idealized model, which serves as a point of departure for more realistic models. Some general results that can be derived from previous research on change-point problems are presented; and more specific problems arising out of the underlying genetics are discussed.

Participants

Speakers

Professor Mike Campbell	Sheffield
Professor Chris Jennison	Bath
Professor Tony Lawrance	Birmingham
Professor Ilya Molchanov	Glasgow
Professor Gareth Roberts	Lancaster
Professor David Siegmund	Stanford, visiting Cambridge

Staff   Students

Aberystwyth
Dr John Basterfield   Mr Alan Jones
Dr John Lane   Prof Dennis Lindley
Miss Sylvia Lutkins   Dr Bakri Assas

Bangor
Mr Chris Whitaker

Birmingham
Prof Henry Daniels   Dr Richard Atkinson   Mr Demetrius Bagavos
Prof Frank Critchley   Mr Roger Holder

Cardiff
Dr Valentina Moskvina   Mr Malcolm Morrisey
Dr Sujit Sahu   Mr Glyn Jones
Prof Anatoly Zhigljavsky

DRL Research Labs, Oxford
Dr Roger Owen

Salford
Dr Michael Cain

Swansea
Prof Alan Hawkes   Dr John Pemberton   Mr Richard Johnson
Dr Alan Watkins

University of Wales College of Medicine
Dr Frank Dunstan   Ms Victoria Cornelius
                                                 Mr Phillip Bartley

Warwick
Prof John Copas   Dr J. Q. Shi   Ms Karla Hemming
Ms Beatrice Giglio   Mr Fotios Siannis
                                                 Mr Konstantinos Triantafyllopoulos
                                                 Mr Giovanni Montana
                                                 Ms Biatriz Penalosa