



UNIVERSITY OF SYDNEY

SCHOOL OF MATHEMATICS AND STATISTICS

Statistics Seminar

Friday, 2 September, 2.00pm

Carslaw 173

Modelling Dependence in Time Series of Counts

Professor William T.M. Dunsmuir
University of New South Wales

Abstract

Over the last decade there have been major developments of models for serial dependence in time series of counts. These have largely been driven by examples arising in areas as diverse as public health and financial econometrics.

In the financial applications the impact of previous transactions on the current transaction is the focus. In the public health applications objectives typically include assessment of covariates such as environmental or meteorological variables, assessment of significance of temporal trends or seasonal patterns and assessment of the impact of a policy change or other interventions. Examples include: impact of pollution on asthma; changes in blood alcohol levels and road fatalities; tracking of medical errors and syndromic surveillance for disease outbreaks.

The talk will begin with a review of some recent applications based on which the typical modelling challenges will be summarised. Often the focus is on inference about regression variables in which adjustment for serial dependence is crucial. Numerous models have been proposed for these types of problems but assessment of the performance of the models and methods is underdeveloped. This talk aims to review the current situation. It will do this by focussing on the class of models in which, conditional on a time series of state variables, the observations time series has an exponential family distribution or similar. Examples include binary, binomial, negative binomial and Poisson. The state variable conveys the contribution from the regression variables as well as the dependence between observations at different times.

There are significant theoretical and computational challenges with existing models. Typical series lengths are in the thousands of observations. Theoretical properties and computational aspects of model estimation will be compared between the two broad model classes reviewed. Opportunities for future theoretical and computational work will be identified.

Enquiries about the Statistics Seminar should be directed to
Marc Raimondo (marcr@maths.usyd.edu.au)