MACQUARIE UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
STATISTICS SEMINAR SERIES

Speaker: Dr Kylie-Anne Richards, UTS Business School, University of Technology Sydney
Date: Tuesday, 27th August 2019
Time: 1pm-2pm
Venue: 14 SCO Avenue, Access Grid Room 146

Title: Score Test for Marks in Hawkes Processes

Abstract:

A score statistic for detecting the impact of marks in a linear Hawkes self-exciting point process is proposed, with its asymptotic properties, finite sample performance, power properties using simulation and application to real data presented. A major advantage of the proposed inference procedure is the Hawkes process can be fit under the null hypothesis that marks do not impact the intensity process. Hence, for a given record of a point process, the intensity process is estimated once only and then assessed against any number of potential marks without refitting the joint likelihood each time.

Marks can be multivariate as well as serially dependent. The score function for any given set of marks is easily constructed as the covariance of functions of future intensities fit to the unmarked process with functions of the marks under assessment. The asymptotic distribution of the score statistic is chi-squared distribution, with degrees of freedom equal to the number of parameters required to specify the boost function.

Model based, or non-parametric estimation of required features of the marks marginal moments and serial dependence can be used. The use of sample moments of the marks in the test statistic construction do not impact size and power properties.

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