UNIVERSITY OF SYDNEY

SCHOOL OF MATHEMATICS AND STATISTICS

Statistics Seminar

Friday, 6 October, 2.00pm

Eastern Avenue Lecture Theater

Asymptotic distributions of U-statistics based on trimmed and Winsorized samples

Prof. Yuri V. Borovskikh
Transport University, St Petersburg

Abstract

Halmos(1946) and Hoeffding(1948) introduced U-statistics as the unbiased estimators of unknown parameters. In order to improve the properties of these estimators we use "trimming" based on the idea of exluding either a fixed or a growing number of the extremes (smallest and largest order statistics) from the original U-statistical sum $\mathbf{U}$. The *trimmed* $\mathbf{U_T}$ and *Winsorized* $\mathbf{U_w}$ versions are of interest as they provide more robust alternatives to the original $\mathbf{U}$. The existing asymptotic theory for $\mathbf{U_T}$ and $\mathbf{U_w}$ focusses only on convergence to the normal distribution whereas the general asymptotic theory for $\mathbf{U}$ takes in a wide class of limit distributions and random variables including multiple stochastic integrals and distributions of random variables in infinite-dimensional spaces. We establish the convergence in distribution for trimmed and Winsorized versions of U-statistics having both Gaussian and non-Gaussian asymptotic distributions. Our results show that for trimmed and Winsorized versions the class of limit random variables is a peculiar mixture of random variables which have appeared in limit theorems of classical U-statistics and in the asymptotic theory of order statistics.

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