



UNIVERSITY OF SYDNEY

SCHOOL OF MATHEMATICS AND STATISTICS

Statistics Seminar

Friday 18 October, 2.00 p.m.

Lecture Room 453 (Level 4, Carslaw Building)

**Limit theorems for self-normalized sums with
applications in statistics**

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Abstract

The normalization in classical limit theorems related with sample mean is usually to use a sequence of constants. It is well-known that moment conditions or other related assumptions are necessary and sometimes sufficient for many classical limit theorems. For instance, a necessary and sufficient condition for a large deviation result is that the moment generating function is finite in a neighborhood of zero. However, the situation becomes very different if the normalizing constants are replaced by a sequence of random variables. In this talk, we shall show that limit theorems for self-normalized sums put a totally new countenance upon the classical limit theorems, i.e., many classical limit theorems remain true for the self-normalized sums of independent random variables under much weaker moment conditions than those required in the classical limit theorems. For instance, no moment conditions are needed for self-normalized large-deviation results, an exponential non-uniform Berry-Esseen bound for self-normalized sums can be derived assuming only finite third moments, etc. Applications to Bootstrap, change-point analysis as well as unit root tests will be discussed.

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