PhD Course

Limit Theorems of Probability Theory
by Professor Valentin V. Petrov, University
of St. Petersburg

Place and dates

The course will be given at the University of Copenhagen. Lectures are given 10:15-12:00 and 14:15-16:00 on the following days:

- October 3, Aud. 9, Inst. of Maths (HCØ)

- October 4, 10:15-12:00 Aud. NO 22, Inst. of IT (Datalogi) 15:15-16:00, Aud. 9, (HCØ) 14:15-15:00, Aud. 8 (HCØ))

- October 6, Aud. 6, (HCØ)

Course description

Limit theory lies at the heart of probability and statistics. Results such as the laws of large number, the central limit theorem and the law of the iterated logarithm for iid and independent random variables have given shape to modern probability theory. They have been extended and generalized in many directions, among others, to more general stochastic processes and random measures, and they have become the bases of asymptotic statistics.

It is the aim of the course to study refinements of the classical limit results.

These include

- the Berry-Esseen inequality and its generalizations,

- asymptotic (Edgeworth) expansions,

- Cramér-type large deviations results,

- different forms of the laws of large numbers and of the iterated logarithm.

Main ingredients to the proofs of these results are

- characteristic functions techniques,

- probability inequalities for maxima of partial sums processes,

- exponential inequalities,

- Chebyshev-Hermite polynomials,

- Borel-Cantelli techniques

- and many other tools and techniques which have proved useful in probability theory and statistics.

Prerequisites are advanced courses in probability theory and stochastic processes. The course will be accessible to PhD students in probability theory, econometrics, statistics, actuarial sciences. It is also recommended to Master students of these fields in the 4th-5th year of their studies. The course can be made to count for 2.5 ECTS if the students are willing to attend the course and to provide a small project.

Recommanded literature

V.V. Petrov, Limit theorems of probability theory, Oxford University Pres, 1995

About Professor V.V. Petrov

Professor V.V. Petrov is one of the leading Russian probabilists. His work on a.s. convergence, large deviations and asymptotic expansions has been highly influential. His 1975 Springer book "Sums of Independent Random Variables" (Grundlehren der Mathematik) summarized the classical summation theory as provided by Gnedenko, Kolmogorov, Feller, Khintchine, Bernstein, Linnik, Levy, and many others and has become one of the classical books of probability theory.