Optimal Stopping and Applications

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Tuesday, July 3, 15:45–17:45, Medium Hall B

TALKS:
Goran Peskir (*School of Mathematics, Manchester, UK*), COAUTHORS: K. Glover, H.Hulley, **The golden ratio rule**

J. Michael Steele (*University of Pennsylvania, Philadelphia, USA*), COAUTHORS: A. Arlotto, **Distribution and concentration in optimal decision problems**

Alexander Tartakovsky (*University of Southern California, Los Angeles, USA*), **Nearly minimax procedures for detecting a change in distribution**

Alexander Gnedin (*University of London, UK*), **Best-choice problems in the last twenty years**

The golden ratio rule

Goran Peskir
School of Mathematics, Manchester, UK

We show that the first time at which the excursion of the radial part of three-dimensional Brownian motion away from its running minimum and the running minimum itself form the golden ratio is as close as possible to the time of the ultimate minimum in a normalised mean deviation sense. Among other things this offers a rigorous optimality argument for the choice of the golden entrancement in technical analysis of asset prices.

Coauthors: K. Glover, H.Hulley

Distribution and concentration in optimal decision problems

J. Michael Steele
University of Pennsylvania, Philadelphia, USA

In an optimal decision problem one typically articulates a feature of merit such as an expected reward at a stopping time. One then works to find a policy that is optimal and to determine the value achieved by that policy. Of course the reward achieved by a policy is a random variable and there is much more of interest than just the associated value function. In particular, if there is an economic meaning to the reward, one cannot make a judgment between rival policies without an understanding of the risks associated with the policies. At a minimum, this is an invitation to study the variance, concentration, and distribution of the reward that is returned by following a policy. This talk illustrates this theme with concrete examples from the theory of sequential selection, knapsack problems, and sequential investment problems.

Coauthors: A. Arlotto

Nearly minimax procedures for detecting a change in distribution

Alexander Tartakovsky
University of Southern California, Los Angeles, USA

We consider a simple quickest changepoint detection problem in Pollak's minimax setting assuming iid data and that both pre- and post-change distributions are known. In 1985, Pollak proposed a randomized version of the Shiryaev-Roberts (SR) changepoint detection procedure where the zero initial condition is replaced with a random point sampled from the quasi-stationary distribution of the SR statistic, and proved that this randomized procedure, which we refer to as the SRP (Shiryaev-Roberts-Pollak) procedure, has a very strong asymptotic optimality property, minimizing the maximal expected detection delay to within a negligible term o(1) for a low false alarm rate. The question whether this procedure is strictly minimax for any false alarm rate has been open for two decades. We provide counterexamples that show that the SRP procedure is not strictly optimal by constructing a procedure that is optimal in these examples. This novel procedure, recently proposed by Moustakides, Polunchenko, and Tartakovsky, is shown to be nearly minimax under certain general conditions. A comparative study with SRP is performed. Certain parts of this talk are joint work with George Moustakides, Moshe Pollak, and Aleksey Polunchenko.

Best-choice problems in the last twenty years

Alexander Gnedin
University of London, UK

The talk overviews some (relatively) recent advances in the best-choice/secretary problems. These include connections to the theory of records, Poisson-embedded models, game formulations and the problems based on partially ordered data.