universität innsbruck

Department of Mathematics

Inn'formal Probability Seminar

Matthias Meiners (Universität Gießen)

"Asymptotic fluctuations in supercritical Crump-Mode-Jagers processes."

Abstract

Branching processes are models for population evolution over time. In individual-based branching processes, the population consists of individuals, each of which can give birth to a random number of offspring, independently of other individuals of the same and previous generations. The offspring reproduces in the same way, leading to a branching structure.

The Crump-Mode-Jagers (CMJ) process is a fairly general branching process that unifies and extends earlier models of individual-based branching processes. Nerman's celebrated law of large numbers (1981) states that, for a supercritical CMJ process $(\mathcal{Z}_t)_{t\geq 0}$, under some mild assumptions, $e^{-\alpha t}\mathcal{Z}_t$ converges almost surely as $t \to \infty$ to aW. Here, $\alpha > 0$ is the Malthusian parameter, a is a constant and W is the limit of Nerman's martingale, which is positive on the event that the population survives.

I shall present a recently obtained central limit theorem for the CMJ process that explains how $\mathcal{Z}_t$ fluctuates around its first-order term $e^{\alpha t}aW$.

Based on joint work with Alexander Iksanov and Konrad Kolesko

Tuesday | 30.05.2023 | 14:15

HSB6 | Civil Engineer Building