



FB Mathematik

FB Physik, Mathematik und Informatik
Institut für Mathematik

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Institut für Mathematik
Schwerpunkt Stochastik

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Rhein-Main-Kolloquium Stochastik

TU Darmstadt, Goethe-Universität Frankfurt und Gutenberg-Universität Mainz

Friday, 17 January, 2025

3:15 pm: [M. Meiners \(Uni Gießen\)](#)

“Asymptotic fluctuations of supercritical general branching processes”

Abstract: The general branching process or 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 $(Z_t)_{t \geq 0}$, under some mild assumptions, $e^{-\alpha t} Z_t$ converges almost surely as $t \rightarrow \infty$ to a random variable 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 Z_t fluctuates around its first-order term $e^{\alpha t} aW$. The talk is based on joint work with Alexander Iksanov (Kyiv) and Konrad Kolesko (Wroclaw).

4:15 pm: Coffee break

4:45 pm: [David Belius \(UniDistance Suisse\)](#)

“The TAP approach to mean field spin glasses”

Abstract: Mean-field spin glass models like the Sherrington-Kirkpatrick model and its generalizations are paradigmatic examples of complex systems, and exhibit exotic and fascinating phenomena. Recently the Thouless-Anderson-Palmer (TAP) approach to these models has enjoyed renewed interest in the mathematics literature. This talk will give an overview of spin glasses and the TAP approach. Time permitting it will also present an upper bound for the free energy of these models in terms of the so-called TAP free energy. The proof elegantly relates the partition function of the model to the TAP free energy, by uses a microcanonical geometric method arising from a partition of the configuration space. The latter result is from the preprint <https://arxiv.org/abs/2204.00681>.

<https://www.stochastik.mathematik.uni-mainz.de/rhein-main-kolloquium-stochastik/>

Venue:

Johannes Gutenberg-Universität Mainz
Building 2413, 5th floor | Room 05-432 (Hilbertraum)
Staudingerweg 9, 55128 Mainz

Any interested parties are welcome.

Yours, Lisa Hartung and Matthias Birkner