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Einladung

zum

Oberseminar Stochastik

am Donnerstag, dem **1. Februar 2018**, um **14 Uhr** im **Seminarraum 2**
des Mathematischen Instituts (Raum 204), Weyertal 86–90, 50931 Köln

Es spricht

Lars Schmitz
(Universität zu Köln)

zum Thema

Log-distance of the front of the Fisher-KPP-equation and Parabolic Anderson Model (PAM) with bounded random prefactor.

Consider the discrete-space, one-dimensional version of the inhomogeneous Fisher-KPP-equation

$$\frac{\partial v}{\partial t}(t,x) = \frac{1}{2}\Delta_d\, v(t,x) + \xi(x)v(t,x)\big(1 - v(t,x)\big),$$
$$v(0,x) = 1_{(-\infty,0]}(x), \quad (t,x) \in (0,\infty)\times\mathbb{Z},$$

where Δ_d denotes the discrete Laplacian, and its linearized version, the Parabolic Anderson Model (PAM). These differential equations describe population dynamics (Fisher-KPP) or model certain problems in chemical dynamics (PAM). Primarily, the *front* $m(t) \coloneqq \sup\left\{x \in \mathbb{Z}: v(t,x) \geq \frac{1}{2}\right\}$ of the solution is of special interest. For the homogeneous ($\xi \equiv 1$), continuous space ($\mathbb{R}$ instead of $\mathbb{Z}$ and $\frac{\partial^2}{\partial x^2}$ instead of Δ_d) version, Bramson ('78) found a precise asymptotic of $m(t)$ up to logarithmic order. Additionally, the front of the Fisher-KPP-equation lacks at most logarithmically behind the front of the PAM. If we randomize our model, i.e. assume $(\xi(x))_{x\in\mathbb{Z}}$ to be a sequence of i.i.d. random variables, uniformly bounded away from 0 and $+\infty$, we conjecture that this statement remains true: There exists a *deterministic* constant $C > 0$, such that the distance of both fronts is at most $C\log t$ for all t large enough. Due to its close connection to Branching Random Walk, the study of those equations permits a probabilistic point of view. If time permits, I will state some recent results for the continuous Fisher-KPP-equation with certain non-random $(\xi(x))_{x\in\mathbb{R}}$. Here, the model can be seen as a functional of a Branching Brownian motion. The talk is based on ideas from the paper [CD17].

[CD17] J. Černý and A. Drewitz. Quenched invariance principles for the maximal particle in branching random walk in random environment and the parabolic Anderson model. arXiv:1711.00852

Alle Interessenten sind herzlich eingeladen.

Die Dozenten der Stochastik