Universität zu Köln

Department Mathematik/Informatik
Prof. Dr. Alexander Drewitz

Einladung zum Oberseminar Stochastik

Am Donnerstag, den 04. Juli 2019, um 17.45 Uhr im Seminarraum 2 (Raum 204) des Mathematischen Instituts, Weyertal 86−90, 50931 Köln. Es spricht:

Lars Schmitz

(Universität zu Köln)

zum Thema

The Fisher-KPP-equation and the Parabolic Anderson Model with bounded random binary branching rates.

Abstract: In population dynamics, the Fisher-Kolmogorov-Petrowski-Piscounov (F-KPP) equation

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

Is a classic model to describe the density of a population which spreads on the real line in the following manner: Starting with a saturated population to the left of some barrier at time 0, the individua will diffusively move around with constant diffusion parameter after removing the barrier. The logistic growth of the density is due to reproduction of the population, which, at site x, is facilitated by high values of $\xi(x)$. Because of their relation to branching processes, PDEs like (F-KPP) can be analyzed using probabilistic methods.

We will assume $(\xi(x))_{x\in\mathbb{R}}$ to be a suitable collection of random variables on $(\Omega, \mathcal{F}, \mathbb{P})$ fulfilling a certain mixing and boundedness condition. We will investigate the solution u of the corresponding linearisation of (F-KPP), the parabolic Anderson model (PAM), where the term $v(1-v)$ is replaced by v. Then we will take a look at the front $m(t) \coloneqq sup\{x \in \mathbb{R}: u(t,x) \geq 1/2\}$ of this solution and compare the corresponding fronts of (F-KPP) and (PAM) in the quenched setting. Finally, we will discuss possible modifications and generalizations of the model.

Alle Interessenten sind herzlich eingeladen.

Die Dozenten der Stochastik