Celebrating Vladas Sidoravicius

Probability Webinar - IM/UFRJ

Frank den Hollander

Leiden University, The Netherlands

The Parabolic Anderson Model on a Galton-Watson Tree

We consider the parabolic Anderson model on a supercritical Galton-Watson tree with an i.i.d. random potential whose marginal distribution is close to the double-exponential. Under the assumption that the degree distribution has a sufficiently thin tail, we derive an asymptotic expansion for large times of the total mass of the solution given that initially a unit mass sits at the root. We derive the expansion both under the *quenched law* (i.e., conditional on the realisation of the random tree and the random potential) and under the *half-annealed law* (i.e., conditional on the realisation of the random tree but averaged over the random potential). The two expansions turn out to be different, but both contain a coefficient that is given by a variational formula indicating that the solution concentrates on a subtree with minimal degree according to a computable profile. A key tool in the analysis is the large deviation principle for the empirical distribution of a Markov renewal process.

Joint work with Wolfgang König (Berlin), Renato dos Santos (Belo Horizonte), Daoyi Wang (Leiden).

Donatas Surgailis

Vilnius University, Lithuania

Local Scaling Limits of Lévy Driven Fractional Random Fields

We obtain a complete description of local anisotropic scaling limits for a class of fractional random fields X on $\mathbb{R}^2$ written as stochastic integral with respect to an infinitely divisible random measure. The scaling procedure involves increments of X over points the distance between which in the horizontal and vertical directions shrinks as $O(\lambda)$ and $O(\lambda^\gamma)$ respectively as $\lambda \downarrow 0$, for some $\gamma > 0$. We consider two types of increments of X: usual increment and rectangular increment, leading to the respective concepts of γ-tangent and γ-rectangent random fields. We prove that for above X both types of local scaling limits exist for any $\gamma > 0$ and undergo a transition, being independent of $\gamma > \gamma_0$ and $\gamma < \gamma_0$, for some $\gamma_0 > 0$; moreover, the 'unbalanced' scaling limits ($\gamma \neq \gamma_0$) are (H_1, H_2)-multi self-similar with one of H_i, $i = 1, 2$, equal to 0 or 1. The paper extends Pilipauskaitė and Surgailis (2017) and Surgailis (2020) on large-scale anisotropic scaling of random fields on $\mathbb{Z}^2$ and Benassi et al. (2004) on 1-tangent limits of isotropic fractional Lévy random fields.

Joint work with Vytautė Pilipauskaitė (University of Luxembourg).

August 23, 2021

14:00 (Rio de Janeiro local time, CEST-5)

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