

## **Yet more applications of the theory of one-dimensional Levy processes**

Organizer: Kouji Yano, Kyoto University, Japan

The theory of Levy processes has been deeply studied and extensively applied. The aim of this session is to present a rich variety of new applications of the theory of Levy processes, especially in the one-dimensional case.

### **Fluctuation scaling limits for positive recurrent jumping-in diffusions**

Kosuke YAMATO, Kyoto University  
kyamoto@math.kyoto-u.ac.jp

For positive recurrent jumping-in diffusions, we establish distributional limits of the fluctuations of inverse local times and occupation times. For this purpose, we introduce and utilize eigen functions with modified Neumann boundary condition depending on the singularity of the exit boundary.

### **Distributional limit theorems for intermittent maps**

Toru SERA, Kyoto University  
sera@math.kyoto-u.ac.jp

Interval maps with indifferent fixed points are called intermittent maps. In statistical physics, they have been studied as models of intermittent phenomena, such as intermittent transition from laminar phases to turbulent bursts in convective fluid.

In this talk, we will review several distributional limit theorems for intermittent maps, such as stable law, Darling--Kac type limit theorem and generalized arcsine laws.

### **On the bail-out dividend problem for spectrally negative Markov additive models**

Kei NOBA, Kyoto University, knoba@math.kyoto-u.ac.jp; JL PEREZ, CIMAT, jluis.garmendia@cimat.mx; X. YU, The Hong Kong Polytechnic University, xiang.yu@polyu.edu.hk

In this talk, we think about the bail-out optimal dividend problem with regime switching under the constraint that the cumulative dividend strategy is absolutely continuous. We confirm the optimality of the regime modulated refraction-reflection strategy when the underlying risk model follows a general spectrally negative Markov additive process.

To verify the conjecture of a barrier, type optimal control, we first introduce and study an auxiliary problem with the final payoff at an exponential terminal time and characterize the optimal threshold explicitly using fluctuation identities of the refracted-reflected Lévy process. Second, we transform the problem with regime-switching into an equivalent local optimization problem with a final payoff up to the first regime switching time. The refraction-reflection strategy with regime-modulated thresholds can be shown as optimal by using results in the first step and some fixed point arguments for auxiliary recursive iterations.

## **Pathwise uniqueness of SDEs driven by Cauchy processes with drift**

Hiroshi TSUKADA, Kyoto University

hrstsukada@gmail.com

We consider one-dimensional stochastic differential equations driven by Cauchy processes with drift. This driving process is also known as a strictly 1-stable process. In this talk, we study the pathwise uniqueness of solutions to the stochastic differential equations under the non-Lipschitz condition on the diffusion coefficient.