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**Generalized Itô-Nisio theorem and modes of convergence in series expansions of infinitely divisible processes**

The class of infinitely divisible processes provides a flexible framework to model many natural phenomena, but is also used as a building block of more complex models, as for example for jump diffusions. The flexibility of infinitely divisible processes has, in some cases, the drawback that the processes have a complicated structure, which makes them difficult to study.

In this talk we will discuss how to approximate infinitely divisible processes by series of much simpler processes similar to the Karhunen-Loeve representation of Gaussian processes. Such representations are useful for simulation purposes, but also to obtain structural properties. We will in particular focus on strong functional convergence of Karhunen-Loeve type representations, from which one can transfer properties of the approximation sequence to the process itself. As an example of this we will discuss approximations of solutions to stochastic differential equations driven by Levy processes. Our techniques rely on new Itô-Nisio theorems for certain function spaces, which have their roots in high-dimensional probability theory, and which can be used for many other approximations as well.

The talk is based on joint work with Jørgen Hoffmann-Jørgensen (Aarhus University) and Jan Rosinski (University of Tennessee).