**18.10.23 Anthony Réveillac** (INSA Toulouse)

*Pseudo-chaotic expansion and explicit correlation formula for the Hawkes processes*

Hawkes processes have proved to be a powerful probabilistic model for various applications in neurosciences or insurance. These counting processes are defined through their intensity which is stochastic and pathwise dependent on the historical values of the process itself. This implicit definition leads to important drawbacks for performing explicit calculations involving simple quantities like for instance the inter-temporal correlation for which nothing is known to our knowledge outside the stationary case and some very particular examples. In this talk based on a joint work with C. Hillairet, we will fill this gap by exploiting a specific decomposition named pseudo-chaotic expansion mixing some pathwise calculus together with some Malliavin calculus obtained in a previous joint work.

**25.10.23 Sabine Jansen** (LMU München)

*Duality, interacting particle systems, and infinite-dimensional orthogonal polynomials*

Studying the time-evolution of a many-particle system is a difficult task. For some interacting particle systems in $Z^d$, duality and intertwining allow to map the time evolution of one- or two-point correlation functions of a many-particle system to the time evolution of a one- or two-particle system, a considerable simplification. Often duality functions are products of univariate orthogonal polynomials, one for each site of the lattice. In the talk I will explain how to generalize these dualities, and the algebraic approach with representations of Lie algebras, to particles in $R^d$. This brings in Lévy point processes and infinite-dimensional orthogonal polynomials. Based on joint work with S. Floreani, F. Redig and S.Wagner.

**07.12.23,** Weierstraß Inst., Berlin  **Giovanni Conforti** (Ecole Polytechnique, Paris)

*Invariant integrated convexity profiles for Hamilton-Jacobi-Bellman equ. and applications.*

It has been known for a long time that Hamilton-Jacobi-Bellman (HJB) equations preserve convexity. Equivalently, log-concavity is preserved along the heat equation, namely if one starts with a log-concavity density, then the solution stays log-concave at all times. In this talk, I will argue that carrying out a 2nd-order analysis of coupling by reflection on the characteristics of the HJB equation prompts the existence of weaker notions of convexity that propagate backward along HJB equations. More precisely, by introducing the notion of integrated convexity profile, we are able to construct families of functions that fail to be convex, but are still invariant under the action of the HJB equation.

**12.12.23** 16h Zoom talk **Michael Högele** (Univ. de los Andes, Kolumbien)

*On the tradeoff between almost sure convergence and overshoot integrability with applications*

In this talk we present a quantitative version of the Borel-Cantelli lemma, which allows for a quantification of the "tradeoff" between a.s. rates of convergence and the precise integrability of the overshoot count. This allows to quantify the a.s. convergence in different settings, such as the strong law of large number, a large deviations principle and the a.s. martingale convergence in many different situations. Important examples are the a.s. convergence of M-estimators and Polya urns.

**11.01.24 11h Andrey Pilipenko** (Nat. Acad. of Sciences & Nat. TU of Ukraine, Kyiv)

*On the generalized Skorokhod reflection problem*

The Skorokhod reflection was used in 1961 to create a reflected diffusion on the half-line. Later, it was used for processes with jumps such as reflected Lévy processes. Like a Brownian motion, which is a weak limit of random walks, reflected processes on the half-line serve as weak limits of random walks with switching regimes at zero: one regime away from zero, the other around zero. We develop a general theory of this regime change and prove convergence to a function with generalized reflection. Our results are deterministic and can be applied to a wide class of stochastic processes. Applications include storage processes, heavy traffic limits, diffusion on a half-line with a combination of continuous reflection, jump exit, and a delay at 0.

**Interessenten sind herzlich eingeladen! Anyone interested is welcome**

**Prof. Dr. Sylvie Roelly**