

Rama Cont

Functional calculus and representation formulas for integer-valued random measures

Joint with Pierre Blacque

We develop a pathwise calculus for functionals of integer-valued measures and use it to derive an integral representation formula for martingales with respect to a large class of integer-valued random measures. Smooth functionals in the sense of this pathwise calculus are shown to be dense in the space of square-integrable (compensated) integrals. Using these results, we extend the framework of Functional Ito Calculus to functionals of integer-valued random measures. We construct a 'stochastic derivative' operator with respect to an integer-valued random measure and obtain an explicit martingale representation formula for square-integrable martingales with respect to the filtration generated by such integer-valued random measures. Our results hold beyond the class of Poisson random measures and allow for random and time-dependent compensators.