Adaptive estimation methods for pure jump Lévy processes in high frequency setting

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This talk is concerned with nonparametric estimation of the Lévy density of a Lévy process. The sample path is observed at n equispaced instants with sampling interval Δ. We develop several nonparametric adaptive methods of estimation based on deconvolution, projection and kernel. The asymptotic framework is: n tends to infinity, $\Delta = \Delta_n$ tends to 0 while $n\Delta_n$ tends to infinity (high frequency). Bounds for the L^2-risk of several types of adaptive estimators are given in the pure jump case: to that aim, procedures including cutoff, bandwidth, or model selection are described, in the different contexts of Fourier, kernel or projection methods. Rates of convergence are discussed. A specific method for estimating the jump density of compound Poisson processes is presented. Examples and simulation results illustrate the performance of estimators. The generalization to the setting of processes including a drift or a Gaussian component is discussed.

Keywords: adaptive estimation, Lévy process, non parametric methods, high frequency data.