Limit theorems for Levy moving average processes with application to statistics

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In this talk we present some new limit theorems for power variation of k-th order increments of stationary increments Levy driven moving average processes. In this infill sampling setting, the asymptotic theory gives very surprising results, which (partially) have no counterpart in the theory of discrete moving average processes. More specifically, we will show that first order limit theorems and the mode of convergence strongly depend on the interplay between the given order of the increments, the considered power $p>0$, the Blumenthal-Getoor index β of the driving pure jump Levy process L and the behaviour of the kernel function g at 0 determined by the power α. First order asymptotic theory essentially comprise three cases: stable convergence towards a certain infinitely divisible distribution, an ergodic type limit theorem and convergence in probability towards an integrated random process. We also prove the second order limit theorem connected to the ergodic type result. When the driving Levy motion L is a symmetric β -stable process we may obtain two different limits: a central limit theorem and convergence in distribution towards a $(1- \alpha) \beta$ -stable random variable. We demonstrate how these results can be applied to estimate the parameters α and β.
Keywords: High frequency data; limit theorems; moving averages; fractional processes; power variation.