On Limit Theory for Levy Semistationary processes

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We highlight extensions of the limit theory in the setting of infill asymptotics for stationary increments Lévy driven moving averages (LDMAs) that has been presented in a previous talk. Firstly, for applications it is often more natural to consider LDMAs modulated by a random volatility, that is processes defined as

$$X_t := \int_{-\infty}^{t} g(t-s)\sigma_s dL_s,$$

which are referred to as Lévy semistationary processes. Here, L is a pure jump Lévy process, g is a deterministic kernel and σ is a predictable volatility process. As for LDMAs, the first order limit theory for power variation of these processes depends on the interplay between the considered power p, the Blumenthal-Getoor index β of the driving Lévy process and the behavior of the kernel g at 0.

Secondly, we extend the limit theory for LDMAs to more general functionals than power variations, more specifically to functionals of the form

$$V(f,X)_n := b_n \sum_{i=1}^{n} f(a_n \Delta_i^n X), \quad \Delta_i^n X := X_{i/n} - X_{(i-1)/n},$$

where f is a continuous function and (a_n) and (b_n) are appropriate scaling sequences.