

Fractional Lévy processes with an application to long memory moving average processes

TINA MARQUARDT

Center for Mathematical Sciences, Munich University of Technology, Boltzmannstr. 3, D-85747 Garching, Germany. E-mail: marquard@ma.tum.de

Starting from the moving average (MA) integral representation of fractional Brownian motion (FBM), the class of fractional Lévy processes (FLPs) is introduced by replacing the Brownian motion by a general Lévy process with zero mean, finite variance and no Brownian component. We present different methods of constructing FLPs and study second-order and sample path properties. FLPs have the same second-order structure as FBM and, depending on the Lévy measure, they are not always semimartingales. We consider integrals with respect to FLPs and MA processes with the long memory property. In particular, we show that the Lévy-driven MA process with fractionally integrated kernel coincides with the MA process with the corresponding (not fractionally integrated) kernel and driven by the corresponding FLP.

Keywords: CARMA process; fractional integration; fractional Lévy process; long memory; Lévy process; stochastic integration