Generating long memory models based on CARMA processes

Abstract: Starting from short memory (Gaussian) processes we present various approaches to construct long memory processes and generalize these concepts to the Lévy setting. Moreover, Ornstein-Uhlenbeck processes are replaced by more general moving average (MA) processes, e.g. CARMA processes, thus allowing to model a broader class of autocorrelation functions, for instance oscillating autocorrelations. We obtain superpositions of MA processes, in particular supCARMA processes, as well as, by randomizing the time scale of short memory processes, a rather large class of long memory MA processes. Finally, Lévy-driven Gamma-mixed moving average processes exhibiting long memory are introduced. The latter model has the nice property that its integrated process can be calculated explicitly and converges to a fractional Lévy process.