Parameter Estimation and Bootstrap for Lévy-driven continuous-time autoregressive processes

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We develop a parameter estimation of Lévy-driven continuous time autoregressive processes using the observation and state space representation. The underlying continuous time parameters can be extracted from the vector autoregressive parameter matrix when writing the solution of the state space equation as a vector autoregressive process of order one. Based on discrete time observations and some auxiliary observations on a finer lattice, estimators for the continuous time autoregressive parameters are derived. The estimators are shown to be consistent if the width of the auxiliary observation lattice tends to zero with increasing sample size. Furthermore, a bootstrap procedure based on the solution of the underlying stochastic differential equations is developed and it is pointed out why bootstrap proposals based on other estimation methods may fail.