ESTIMATION OF TIME−VARYING AUTOREGRESSIVE SYMMETRIC ALPHA STABLE PROCESSES BY PARTICLE FILTERS (ThuAmOR5)

Author(s) :

Deniz Gencaga (Bogazici University, Turkey)
Ercan E. Kuruoglu (ISTI, CNR, Pisa, Italy)
Aysin Ertuzun (Bogazici University, Turkey)

Abstract :

In the last decade alpha−stable distributions have become a standard model for impulsive data. Especially the linear symmetric alpha−stable processes have found applications in various fields. When the process parameters are time−invariant, various techniques are available for estimation. However, time−invariance is an important restriction given that in many communications applications channels are time−varying. For such processes, we propose a relatively new technique, based on particle filters which obtained great success in tracking applications involving non−Gaussian signals and nonlinear systems. Since particle filtering is a sequential method, it enables us to track the time−varying autoregression coefficients of the alpha−stable processes. The method is tested both for abruptly and slowly changing autoregressive parameters of signals, where the driving noises are symmetric−alpha−stable processes and is observed to perform very well. Moreover, the method can easily be extended to skewed alpha−stable distributions.

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