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Title:
Fractional Pearson Diffusions and Continuous Time Random Walks
Abstract:

We define fractional Pearson diffusions [5,7,8] by non-Markovian time change in the corresponding Pearson diffusions [1,2,3,4]. They are governed by the time-fractional diffusion equations with polynomial coefficients depending on the parameters of the corresponding Pearson distribution. We present the spectral representation of transition densities of fractional Pearson diffusions, which depend heavily on the structure of the spectrum of the infinitesimal generator of the corresponding non-fractional Pearson diffusion. Also, we present the strong solutions of the Cauchy problems associated with heavy-tailed fractional Pearson diffusions and the correlation structure of these diffusions [6] .

Continuous time random walks have random waiting times between particle jumps. We define the correlated continuous time random walks (CTRWs) that converge to fractional Pearson diffusions (fPDs) [9,10,11]. The jumps in these CTRWs are obtained from Markov chains through the Bernoulli urn-scheme model, Wright-Fisher model and Ehrenfest-Brillouin-type models. The jumps are correlated so that the limiting processes are not Lévy but diffusion processes with non-independent increments.

This is a joint work with M. Meerschaert (Michigan State University, USA), I. Papic (University of Osijek, Croatia), N.Suvak (University of Osijek, Croatia) and A. Sikorskii (Michigan State University and Arizona University, USA).

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