

Design for estimation of drift parameter in fractional diffusion system

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(joint work with Marina Kleptsyna and Alexandre Popier, Le Mans)

Abstract

The present talk is devoted to the large sample asymptotic properties of the Maximum Likelihood Estimator (MLE) for the signal drift parameter ϑ in a partially observed and controlled fractional diffusion system.

Namely, we consider real-valued functions $x = (x_t, t \geq 0)$ and a process $Y = (Y_t, t \geq 0)$, representing the signal and the observation respectively, governed by the following homogeneous linear system of ordinary and stochastic differential equations:

$$\begin{cases} dx_t &= -\vartheta x_t dt + u(t)dt, & x_0 = 0, \\ dY_t &= \mu x_t dt + dV_t^H, & Y_0 = 0. \end{cases} \quad (1)$$

where $u = (u(t), t \geq 0)$ is a control of the signal. Here, $V^H = (V_t^H, t \geq 0)$ is normalized fBm with Hurst parameter $H \in (0, 1)$ and the coefficients ϑ and $\mu \neq 0$ are constants.

We suppose that parameter $\vartheta > 0$ is unknown and is to be estimated given the observed trajectory $Y^T = (Y_t, 0 \leq t \leq T)$ for a control u in the proper class.