Zhitlukhin M.V. (Steklov Mathematical Institute of RAS, Moscow, Russia). **Sequential changepoint detection for fractional Brownian motion.** Assume we observe the process

$$dX_t = \mu \mathrm{I}(t > \theta)dt + dB_t^H,$$

where $\theta > 0$ is a changepoint, B^H is a fractional Brownian motion, $\mu \neq 0$ is a parameter. The problem is to determine the moment θ from sequential observations of the process X. The detection quality criterion is the probability that the changepoint is covered by an interval of length $2h$, i.e., one maximizes $\mathbf{P}(|\tau - \theta| < h)$, where τ is the detection time (stopping time). It is assumed that θ is an unobservable random variable uniformly distributed on $[0, T]$.

To solve the problem, we define the process $Y_t = \int_0^t K(t,s)dX_s$, where $K(t,s)$ is the kernel transforming fractional Brownian motion into standard Brownian motion. We also introduce the moving average likelihood ratio process

$$A_t = \frac{1}{T}\int_{t-h}^t L_t^s ds, \qquad L_t^s = \begin{cases} \exp\left(\int_s^t \mu(u,s)dY_u - \frac{1}{2}\int_s^t \mu^2(u,s)du\right) \text{ for } t > s, \\ 1 \text{ for } t \leq s. \end{cases}$$

Let E^T denote the expectation with respect to the probability measure under which no change occurs and Y_t is a standard Brownian motion.

Theorem 1 *The following equality holds:*

$$\sup_\tau \mathbf{P}(|\tau - \theta| < h) = \sup_\tau \mathrm{E}^T A_\tau + \frac{h}{T}.$$

This result reduces the changepoint detection problem to an optimal stopping problem for the process A_t. We propose a numerical method for its solution, which is based on approximation of the solutions of the primal and dual problems by neural networks.

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