

Estimating a Wiener process first-passage time from noisy or delayed observations

Marat V. Burnashev, Institute for Information Transmission Problems,
Moscow
(joint work with Aslan Tchamkerten, Telecom ParisTech, Paris)

Abstract

Given a Wiener process X with drift, we consider estimating its first-passage time τ of a given level l , with a stopping time η defined over an observation process Y that is either a noisy version of X , or a delayed version of X . For both cases and general loss functions f , we first provide lower bounds on the mean $\mathbf{E}f(\eta - \tau)$ for any stopping rule η . Then, we exhibit simple stopping rules that achieve these bounds in the large threshold regime and in the large threshold large delay regime, respectively.