

OPTIMAL REAL-TIME DETECTION OF A DRIFTING BROWNIAN COORDINATE

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Consider a three-dimensional Brownian motion whose two coordinate processes are standard Brownian motions with zero drift, and the third (unknown) coordinate process is a standard Brownian motion with a non-zero drift. Given that only the position of the three-dimensional Brownian motion X is being observed, the problem is to detect, as soon as possible and with minimal probabilities of the wrong terminal decisions, which coordinate process has the non-zero drift. We solve this problem in the Bayesian formulation under any prior probabilities of the non-zero drift being in any of the three coordinates when the passage of time is penalized linearly. This is joint work with Goran Peskir (University of Manchester) and Quan Zhou (Rice University).

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