

1109-60-255

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Computational Stochastic Filtering and Large Deviations.

In this talk, we consider a nonlinear/non-Gaussian stochastic filtering problem in a small signal-to-noise ratio environment. A large deviation estimate is established by considering qualitative properties of perturbations of an equivalent observation process. Moreover, the posterior filtering distribution is approximated using a drift homotopy technique for stochastic differential equations (SDE). This computational implementation can be thought of as a stochastic analog of deterministic homotopy methods for solving nonlinear algebraic equations or as an SDE generalization of simulated annealing. A toy example based on small noise double-well stochastic dynamics is also presented. (Received February 02, 2015)