

CRUNCH Seminars at Brown, Division of Applied Mathematics

Friday – March 2, 2018

**Approximate Bayes learning of stochastic differential equations
(Literature Review)**

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We introduce a nonparametric approach for estimating drift and diffusion functions in systems of stochastic differential equations from observations of the state vector. Gaussian processes are used as flexible models for these functions and estimates are calculated directly from dense data sets using Gaussian process regression. We also develop an approximate expectation maximization algorithm to deal with the unobserved, latent dynamics between sparse observations. The posterior over states is approximated by a piecewise linearized process of the Ornstein-Uhlenbeck type and the maximum a posteriori estimation of the drift is facilitated by a sparse Gaussian process approximation.