

Multidisciplinary Simulation, Estimation, and Assimilation Systems

Seminar Series

John Harlim

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Diffusion Forecasts: A nonparametric modeling approach

Abstract: I will discuss a nonparametric modeling approach for forecasting stochastic dynamical systems on low-dimensional manifolds. In the limit of large data, this approach converges to a Galerkin projection of the semigroup solution of the backward Kolmogorov equation of the underlying dynamics on a basis adapted to the invariant measure. This approach allows one to evolve the probability distribution of non-trivial dynamical systems with equation-free modeling. I will also discuss nonparametric filtering methods, leveraging the diffusion forecast in Bayesian framework to initialize the forecasting distribution given noisy observations.

Biography: John Harlim is an associate professor of mathematics and meteorology at the Pennsylvania State University. He received his Ph.D. in Applied Mathematics and Scientific Computation from the University of Maryland in 2006. His research interests are applied mathematics related to data-driven estimation and prediction problems; this includes filtering multiscale dynamical systems, stochastic parameterization, uncertainty quantification, diffusion maps, and nonparametric modeling.

Friday, Oct. 9, 2015

2:30PM; Rm. 5-314

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Hosts:

Pierre Lermusiaux

<http://mseas.mit.edu>

Themis Sapsis

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