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Statistical inference for nonlinear Stochastic PDEs.

While the general form of a model is commonly derived from the fundamental properties of a physical process under study, frequently parameters arise in the formulation which need to be specified or determined on the basis of empirical observation. Given in particular the growing significance of nonlinear stochastic partial differential equations (SPDE) in applications there is a clear need to develop the theory of parameter estimation for such systems. Under the assumption that a phenomenon of interest follows the dynamics of such an SPDE, and given that some realizations of this process are measured, we wish to find these unknown parameters appearing in the model, such that the equations fit or predict as much as possible this observed data. In this work we discuss some recent results concerning the estimation of the 'drift' parameter for a general class of nonlinear SPDE, based on the first N Fourier modes of a single sample path observed on a finite time interval. In particular, we exhibit specific estimators for the viscosity coefficient for the 2D stochastic Navier-Stokes equations, and study asymptotic properties of these estimators.

This talk is based on recent joint work with Nathan Glatt-Holtz. (Received September 02, 2010)