

THE CHINESE UNIVERSITY OF HONG KONG

Department of Statistics

will present a seminar entitled

Spatial Models with Applications in Computer Experiments

by

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on

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2:00pm – 3:00pm

in

Lady Shaw Building G35
The Chinese University of Hong Kong

Abstract:

Often, a deterministic computer response is modeled as a realization from a stochastic process such as a Gaussian random field. In this talk, we describe this stochastic modeling approach and will focus on the use of a stochastic heteroscedastic process (SHP), a stationary non-Gaussian process with stationary covariance function. By conditioning on a latent process, the SHP is a non-stationary Gaussian process. As such, the sample paths of this process exhibit greater variability and hence offer more modeling flexibility than those produced by a traditional Gaussian process (GP) model. The SHP model can also recover Gaussian-like sample paths for certain model parameter values. We use maximum likelihood for inference, which is complicated by the high dimensionality of the latent process. Accordingly, we develop an importance sampling method for likelihood computation and use a low-rank kriging approximation to reconstruct the latent process. Responses at unobserved locations can be predicted using empirical best predictors or by empirical best linear unbiased predictors. Prediction error variances are also obtained. In examples with simulated and real computer experiment data, the SHP model is superior to traditional Gaussian process models. In addition, the SHP model can be used in an active learning context to select new locations that provide improved estimates of the response surface. Implementing active learning via the SHP model appears to work better than other traditional approaches.

All are Welcome