

STATISTICS COLLOQUIUM

TUESDAY, NOVEMBER 22, 2011

TALK: 4:00 PM — SCIENCE CENTER RM. 705

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

Building a Tall Bridge Over a Wide River: Batch Filtered Inference for Multivariate Diffusions

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ABSTRACT

Diffusion processes have been used to model a variety of continuous-time phenomena in Finance, Engineering, and the Natural Sciences. However, parametric inference has long been complicated by an intractable likelihood function. For many models, the most effective solution involves a large amount of missing data for which the typical Gibbs sampler can be arbitrarily slow. On the other hand, joint parameter and missing data proposals can lead to a radical improvement, but their acceptance rate tends to scale exponentially with the number of observations.

We consider here a novel method of dividing the inference process into separate data batches, each small enough to benefit from joint proposals. A filter bridges batch contributions for inference on the whole dataset, or river. We present an example using Heston's stochastic volatility model for financial assets, but much of the methodology extends to Hidden Markov and other State-Space models.