



Gareth Peters

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Adaptive Trans-dimensional MCMC for Bayesian Cointegrated Vector Autoregression models

This talk presents a novel Markov chain Monte Carlo sampling methodology for Bayesian Cointegrated Vector Auto Regression (CVAR) models. The focus will be on two novel extensions to the sampling methodology for the CVAR Bayesian model matrix variate posterior. The first extension developed replaces the popular sampling methodology of the griddy Gibbs sampler with an automated alternative which is based on an Adaptive Metropolis-Hastings algorithm. This is particularly relevant to automate the proposal mechanism in the MCMC algorithm in settings where griddy Gibbs is impractical, such as when the dimension of the CVAR series is large, e.g. $d > 5$. In addition we compare the performance of the adaptive MCMC algorithm with a mixture Metropolis-Hastings alternative.

We also treat the rank of the CVAR model as a random variable and perform joint inference on the rank and model parameters. This is achieved with a Bayesian posterior distribution defined over both the rank and the CVAR model parameters, and inference is made firstly via a Savage-Dickey density estimator for the Bayes Factor analysis of rank. Then these results are compared to a specifically designed Trans-dimensional MCMC sampling algorithms estimates of the posterior probabilities of each rank and also the classical approach based around the Johansen procedure. Note, the Johansen procedure was considered as it does not require all variables to be in the same order of integration, and hence this test is much more convenient than the EngleGranger test for unit roots which is based on the DickeyFuller (or the augmented) test. All results are illustrated on both synthetic data and actual financial data.

About the speaker: Gareth Peters is a Lecturer at the Department of Statistics, UNSW. He is the winner of the J. Douglas award for excellence in postgraduate research in Statistics in 2008. His interests are in Computational Statistics, in Bayesian risk, Commodities, Insurance and Hedge Fund models, in Stochastic Signal processing and Wireless Communications.

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Location: Room RC4082

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