Non-Parametric Bayesian Models for Big Data and Macro/Finance

Joshua Chan
University of Technology Sydney

Syllabus

Course Description: Bayesian econometric methods are increasingly popular in empirical macroeconomics. In particular, flexible models that allow for non-Gaussian distributions and time variation in coefficients and volatility are now widely used among macroeconomists. The overarching purpose of this course is to bring you to the research frontier so that you are prepared to do research in Bayesian macroeconometrics.

This course first provides an overview of Bayesian theory and computations. It then gives a brief review of the linear regression and the Gibbs sampler. Some flexible variations of the linear regression will then be introduced, along with various more sophisticated MCMC algorithms. We will then dive into a few state-of-the-art macroeconometric models, including unobserved components models, time-varying parameter models and stochastic volatility models.

Course notes: The course notes are available at

    http://joshuachan.org/notes_BayesMacro.html

Course outline: We will cover the following topics in this course:

1. Overview of Bayesian econometrics: Bayesian theory and computations

2. Linear regressions: Gaussian and t errors, moving average errors, independence-chain Metropolis-Hastings, Griddy-Gibbs

3. Mixture models: scale mixture of normals, finite mixture of normals

4. Linear state space models: unobserved components models, time-varying parameter models, precision-based samplers

5. Nonlinear state space models: stochastic volatility model, stochastic volatility in mean, auxiliary mixture sampler