Simulation-Based Approaches to Modern Bayesian Econometrics

by

Hedibert Freitas Lopes

Professor of Econometrics and Statistics
University of Chicago Booth School of Business
http://faculty.chicagobooth.edu/hedibert.lopes
hlopes@ChicagoBooth.edu

Lectures from 2pm to 4pm, room A241, IME-USP

PART I: Inference and computation

1. Bayes post-MCMC I - 13/09
2. Bayes post-MCMC II - 18/09

PART II: Linear models

3. General linear models - 27/09
4. Limited dependent variable models - 04/10
5. Bayesian instrumental variables - 11/10

PART III: Multivariate analysis

6. Vector autoregressions - 16/10
7. Factor analysis - 8/11

Part IV: Dynamic models

8. Dynamic models - 22/11
9. Stochastic volatility models - 29/11
10. Sequential Monte Carlo methods - 6/12

ABSTRACT

Part I: Inference and computation

We review basic concepts, such as prior, likelihood, posterior, as well as marginal likelihood, Bayes factor and posterior model probability. These are mingled with the introduction of Monte Carlo (MC) techniques, such as importance sampling, sampling importance resampling, Gibbs sampler, Metropolis-Hastings sampler and reversible jump MCMC amongst many others.

PART II: Linear models

We study standard departures from the classical normal linear regression model. More specifically, we deal with Gaussian heteroskedastic errors, Student's t errors and autocorrelated errors. We also talk about truncated and/or censored regression models as well as deal with simultaneity via instrumental variables.

PART III: Multivariate analysis

Vector autoregressions (VARs) and factor analysis (FA) are the main topics here. The Bayesian VAR literature is relatively popular amongst central bank researchers and modern approaches are discussed, particularly when the number of variables and/or lags are of the same order of magnitude as the data length. Similarly, Bayesian FA have regained popularity in many areas ranging from electroencephalogram applications to financial econometrics and forecasting to mapping the temperature of the globe.

PART IV: Dynamic models

Our main focus here is on state-space modeling and its richness in flexibility and forecasting properties. We spend more time talking conditionally linear and Gaussian state-space models in general and talking about the estimation of stochastic volatility models in particular. We end with sequential Monte Carlo methods for online filtering, smoothing and forecasting.