A Tutorial on Modern Bayesian Econometrics

Syllabus

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Content

1. Basic Bayes
2. Monte Carlo methods
3. Markov chain
4. Markov Chain Monte Carlo
5. Bayesian model criticism
6. WinBugs
7. Hierarchical models
8. Limited dependent variable models
9. Spatial models
10. Dynamic linear models
11. Factor models

Content (detailed)

1. Basic Bayes
2. Monte Carlo methods
   - Monte Carlo integration
   - Rejection algorithm
   - Sampling importance sampling
3. Markov chain
   - Stationary distribution
   - Ergodicity
   - Inefficiency factor
   - Effective sample size
   - Centra limit theorem
   - Reversible chains
4. Markov Chain Monte Carlo
   - Historical background
   - Gibbs sampler
   - Metropolis-Hastings algorithms
5. Bayesian model criticism
   - Bayes factor
   - Computing marginal likelihoods
   - Savage-Dickey ratio
   - Reversible jump MCMC
   - Deviance information critarion

6.WinBugs
- The BUGS Project
- R2WinBugs: WinBugs from R

7.Hierarchical models
- Pooled model
- Individual effects model
- Random coefficients model

8.Limited dependent variable models
- Tobit model
- Linear tobit model
- Probit/ordered probit models
- Multinomial probit model

9.Spatial models
- Classifying spatial data
- Modeling areal data
- Modeling point-referenced data
- Spatial interpolation

10. Dynamic linear models
    - 1st and 2nd order DLMs
    - Prior/updated/smoothed densities
    - Sequential and smoothed inferences
    - Markov chain Monte Carlo
    - Stochastic volatility model

11. Factor models
    - Historical note
    - Identification
    - Loading matrix
    - Prior specification
    - Posterior inference
    - Standard factor model
    - Factor stochastic volatility model
    - Spatial dynamic factor model