

SIde PhD Course: Bayesian Methods in Economics and Finance
(August 26-30, 2017) Bertinoro, Italy

Coordinator:

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Lecturers

Gaetano Carmeci, University of Trieste, Italy
Roberto Casarin, University of Venice, Italy
Matteo Ciccarelli, European Central Bank, DG Research

Basic Requirements

Intermediate knowledge of econometrics.

Description

The course is an introduction on Bayesian Inference, starting from first principles and covering topics of interest for applied econometricians in economics and finance. The course is addressed to students without previous knowledge of Bayesian Econometrics. The methods introduced in the lectures will be illustrated with hands-on applications in MATLAB based on reasoned statistical and economic examples.

Preliminary readings/Reference textbook for the course

Berger, J. O. (1985), *Statistical Decision Theory and Bayesian Analysis*. Springer Series in Statistics (Second ed.). Springer Verlag.

Gilks, W. R., S. Richardson and D. J. Spiegelhalter (1996), *Markov chain Monte Carlo in practice*, London: Chapman and Hall.

Greenberg, E. (2008), *Introduction to Bayesian Econometrics*, Cambridge University Press.

Koop, G. (2003), *Bayesian Econometrics*, J. Wiley.

Koop, G., Dale J. P., Tobias, J. L. (2007.), *Bayesian Econometric Methods*, Cambridge University Press.

Kroese, D.P. and J. Chan (2014), *Statistical Modeling and Computation*, Springer Verlag.

Liu, J. (2001), *Monte Carlo Strategies in Scientific Computing*, Springer Verlag.

Robert, C. P. (2001), *The Bayesian Choice – A Decision-Theoretic Motivation* (second ed.). Springer-Verlag.

Robert, C.P. and Casella G. (2004), *Monte Carlo Statistical Methods*, New York: Springer Verlag.

Robert, C.P. and Casella G. (2009), *Introducing Monte Carlo Methods with R*, New York: Springer Verlag.

Zellner, A. (1971), *Introduction to Bayesian Inference in Econometrics*, Wiley and Sons.

Papers

Bassetti, F., Casarin R., Leisen F. (2014), Beta-product dependent Pitman–Yor processes for Bayesian inference, *Journal of Econometrics*, 180(1), 2014, 49-72.

Billio, M., Casarin, R., Rossini, L. (2019), Bayesian Nonparametric Sparse VAR Models, *Journal of Econometrics*, forthcoming.

Cefis, E. and M. Ciccarelli (2005), Profit differentials and innovations, *Econ. Innov. New Techn.*, Vol. 14(1–2), January–March, pp. 43–61.

Chib, S. (1995), Marginal likelihood from the Gibbs Sampler, *JASA*, 90, 1313-1321

Chib, S. and I. Jeliazkov (2001), Marginal likelihood from the Metropolis-Hastings output, *JASA*, 96, 270-281.

Gefang D. (2014), Bayesian doubly adaptive elastic-net Lasso for VAR shrinkage, *International Journal of Forecasting*, 30(1), 1-11.

Gelfand, A., and D. Dey (1994), Bayesian model choice: Asymptotics and exact calculations, *Journal of the Royal Statistical Society, Series B*, 56, 501-514.

George, E. and R. McCulloch (1993), Variable Selection via Gibbs Sampling, *JASA*, 88, 881-889.

Kalli, M. and J. E. Griffin (2018), Bayesian nonparametric vector autoregressive models, *Journal of Econometrics*, 203(2), 267-282.

Kass, R. and A. Raftery (1995), Bayes Factors, *JASA*, 90, 773-795.

Lindley, D. and A.F.M. Smith (1972), Bayes estimates for the linear model, *Journal of the Royal Statistical Society, Series B*, 34, 1-41.

Handouts, readings and further material will be provided before the beginning of and during the lectures.

Course outline:

A. Fundamentals of Bayesian Statistics

B. Bayesian computation

- **Monte Carlo simulation**
- **Markov chains**
- **Markov Chain Monte Carlo methods (Gibbs sampler and Metropolis-Hastings algorithm)**
 - a. Comparing performance
 - b. Checking convergence
 - c. Optimal scaling
- **An introduction to advanced MCMC and other simulation methods**

C. Bayesian methods for regression models

- **Normal linear regression models**
 - a. Standard LRM with spherical and non-spherical errors
 - b. Hierarchical models
 - i. Seemingly Unrelated Regression models
 - ii. Panel data models
 - c. Introduction to time-varying parameter and stochastic volatility models
- **Bayesian VAR models**
 - a. Basic models
 - i. Likelihood, priors and posterior derivation
 - ii. Uses of VAR models: Forecasting and Structural analysis
 - b. Bayesian VAR Lasso
 - i. Elastic net
 - ii. Adaptive Lasso
 - iii. Doubly adaptive elastic net
 - c. Bayesian VAR nonparametric Lasso

SOFTWARE USED FOR THE APPLICATIONS: MATLAB

Participants will use their laptops with MATLAB already installed on them.

Venue and Timetables

The Module will last one week and will be held in the University Residential Centre, Via Frangipane 6, 47032 Bertinoro (FC). Participants will be hosted in the Centre guest quarters, (as an exception, in case of reduced availability of rooms in the Centre, they will be accommodated in local hotels).

Each Module requires full-time attendance, and participation is not compatible with other jobs at the same time (e.g. preparation of other exams). Lectures and tutorials will be in English, with the following schedule (provisional):

- Monday to Thursday: lectures: 9.00-13.00, 15.00-17.00 (18.00).
- Friday: lectures: 9.00-13.00.

Fees

- Students, PhD students and temporary university staff: 650€
- University staff: 800€
- Others: 2300€

Fee includes: accommodation (usually in double room with breakfast and lunch starting from Sunday evening).

Participants who wish to attend two or three Courses, are allowed the following reduced fees per Course

- Students, PhD students and temporary university staff: 550€ per Course
- University staff: 700€ per Course
- Others: 2000€ per Course

Enrollment

SIde courses and summer schools are open to scholar and practitioners of all levels, but are particularly aimed at junior researchers and PhD students. The only requirement is SIde membership (annual fee 30 Euro). Regular members of SIde are admitted upon application to the Steering Committee. Together with the application to SIde, prospective regular members give their consent to the distribution of their CV and list of publications, in the spirit of disclosure of research in econometrics stated in the goals of SIde. The interest in econometrics is identified by the curriculum of studies and/or the scientific or professional career.

How to apply:

Go to <http://www.side-iea.it/become-member> and provide personal details (name, affiliation), and upload your CV (pdf file, max 2 Mb). Once your application is validated, you will receive a link to a payment gateway for the collection of membership dues. Once the payment is confirmed by our Staff, you will receive a username and password to login into your personal profile and access to restricted contents and the Enrollment procedure

Contacts

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