Applied Statistics A1A2 Term 2019

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Class: Friday 14:55-16:40

Course description:

 This course introduces a statistical simulation method, Markov chain Monte Carlo method. We begin with an introduction of Bayesian statistical analysis and a matrix computer language R and WinBUGS for the calculation of simulations.

Grading: Empirical Paper 70%. Assignment 30%

(1)   Textbook:

Jim Albert (2009), Bayesian Computation with R. 2nd edition, Springer

(2)   Software: R language

The software is installed on the computer maintained by ECCS (Educational Campuswide Computing System) All University of Tokyo members are eligible to use the ECCS. All members are required to take a training seminar before using the system.

(ECCS: https://www.ecc.u-tokyo.ac.jp/en/users.html)

(3)   References (Bayesian Statistics and Markov chain Monte Carlo)

① Gamerman, D. and Lopes, H. F. (2006) Markov Chain Monte Carlo. 2nd edition. Chapman & Hall/CRC.

② Gelman, A., Carlin, J.B., Stern, H.S. and Rubin, D.B. (2004), Bayesian Data Analysis. 2nd edition. Chapman & Hall.

③ Kruschke, J.K. (2011) Doing Bayesian Data Analysis-A Tutorial with R and BUGS. Academic press.

④ Robert, C.P. and Casella, G. (2009) Introduction to Monte Carlo Methods with R. Springer

(in Japanese)

① 中妻照雄「入門ベイズ統計学」朝倉書店　2007 年

② 古澄英男「ベイズ計算統計学」朝倉書店　2015 年

③ 照井伸彦「R によるベイズ統計分析」朝倉書店　2010 年

④ 小西・越智・大森『計算統計学の方法』朝倉書店　2008 年

⑤ 伊庭・種村・大森・和合他著「計算統計Ⅱ－マルコフ連鎖モンテカルロ法とその周辺」岩波書店 2005 年

⑥ アルバート「Rで学ぶベイズ統計学入門」丸善出版

⑦ ロバート・カセーラ「Rによるモンテカルロ法入門」丸善出版

(4) WinBUGS

(https://www.mrc-bsu.cam.ac.uk/software/bugs/the-bugs-project-winbugs/)

① Lunn, J.D., Jackson, C., Best, N., Thomas, A. and Spiegelhalter, D. (2013), The BUGS Book. CRC Press

② Ntzoufras, I. (2008) Bayesian Modelling using WinBUGS. Wiley

(in Japanese)

① 丹後俊郎・Taeko Becque (2011)「ベイジアン統計解析の実際」朝倉書店

(5) References (Applications)

① Rossi, P. E., Allenby, G. M. and McCulloch, R. (2005). Bayesian Statistics and Marketing. Wiley.

② Ibrahim, J. G., Chen, M-H, and Sinha, D. (2001) Bayesian

Survival Analysis Springer

(in Japanese)

① 中妻照雄「実践ベイズ統計学」朝倉書店　2013 年

② 照井伸彦・ダハナ・伴正隆「マーケティングの統計分析」朝倉書店

2009 年