Bayesian statistics under model uncertainty and computations
Project III (MATH3382)

Advisor: Georgios P. Karagiannis

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Description

The focus of this project is the study of methods for model selection, variable selection, model determination, and model averaging in the Bayesian statistics framework, as well as the study of computational methods (mainly Monte Carlo) needed to facilitate inference and prediction for this purpose.

Modern problems in statistics require inference on both the parameters and the structure of the model. Often, a collection of candidate statistical models aiming at representing a real procedure is available, however it is unknown which model is "better" than the other. Interest lies on learning which of these models can "better" represent that procedure for inferential purposes, or how these models can be combined for prediction purposes.

Model selection/averaging involves more complex mathematical structures which require advanced computational tools, such as Monte Carlo, to facilitate inference and predictions.

Pre-requisites

- Statistical Concepts II
- Knowledge of one programming language, such as R, Python, MATLAB, FORTRAN, C/C++
  - alternatively you should be willing to learn one...

Co-requisites

- Nothing in particular, but it is recommended to attend Statistical methods III.

References

- Lecture slides of Jim Berger [LINK]
- Clyde, M., & George, E. I. (2004). Model uncertainty. Statistical science, 81-94. [LINK]
- Sisson, S. A. (2005). Transdimensional Markov chains: A decade of progress and future perspectives. Journal of the American Statistical Association, 100(471), 1077-1089.

Contact details

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