- Faculté des sciences
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Bayesian statistics (3ST2015)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	**Cours: 2 ph**	**Voir ci-dessous**	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Printemps

Equipe enseignante

Dr. Pierre-Yves Deléamont
Institut de statistique
Av. de Bellevaux 51 , CH-2000 NEUCHATEL

Contenu

This course will, if time permits, cover the following topics:

I. Basic theory
- The Bayesian choice
- Foundations of Bayesian inference
- Single-parameter models
- Introduction to multi-parameter models
- Hierarchical models
- Model choice

II. Introduction to Bayesian computation
- Basics of Bayesian computation
- Rejection sampling
- Importance sampling

III. Markov chain Monte Carlo methods
- Motivation
- Basics of Markov chains
- Metropolis-Hastings algorithm
- Gibbs sampling

IV. Selected applications
- Generalized linear models
- Mixture models

Forme de l'évaluation

The final mark will be based on a 2 hour written examination. Students retaking this course will pass the 2 hour written examination under the same conditions as the ones which apply to the students of the current year. This includes possible changes in the course contents.

Documentation

- Robert, C.P., The Bayesian Choice: from Decision-Theoretic Foundations to Computational Implementation (2nd edition). Springer, 2007.
- Gelman, A., Carlin, J., Stern, H., Dunson, D., Vehtari, A., and Rubin, D., Bayesian Data Analysis (3rd edition). Chapman and Hall, 2013.
- Albert, J., Bayesian Computation with R (2nd edition). Springer, 2009.
- Robert, C.P., and Casella, G., Introducing Monte Carlo Methods with R. Springer, 2010.

Pré-requis

Inferential statistics, Probability, R programming

Forme de l'enseignement

- 3 ECTS credits
- Spring semester

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