UCL Institut de statistique

STAT

STAT2415 Introduction to Bayesian statistics.

[15h] 2.5 credits

This course is taught in the 1st semester

Teacher(s): Philippe Lambert
Language: french
Level: 2nd cycle course

Aims

By the end of the course, the student will be familiar with the principles and the basic techniques in Bayesian statistics. He or she will be able to use and to put forward the advantages and drawbacks of that paradigm in standard problems.

Main themes

- The Bayesian model: basic principles.
- The likelihood function and its a priori specification.
- One-parameter models: choice of the a priori distribution, derivation of the a posteriori distribution, summarizing the a posteriori distribution.
- Multi-parameter models: choice of the a priori distribution, derivation of the a posteriori distribution, nuisance parameters. Special cases: the multinomial and the multivariate Gaussian models.
- Large sample inference and connections with asymptotic frequentist inference.
- Bayesian computation.

Content and teaching methods

- The Bayesian model: basic principles.
- The likelihood function and its a priori specification.
- One-parameter models: choice of the a priori distribution, derivation of the a posteriori distribution, summarizing the a posteriori distribution.
- Multi-parameter models: choice of the a priori distribution, derivation of the a posteriori distribution, nuisance parameters. Special cases: the multinomial and the multivariate Gaussian models.
- Large sample inference and connections with asymptotic frequentist inference.
- Bayesian computation.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

References :
Congdon, P. (2001) Bayesian Statistical Modelling. Wiley.
Gelman, A., Carlin, J.B., Stern, H.S. and Rubin, D.B. (1995) Bayesian Data Analysis. Chapman and Hall.
Robert, C.P. (1992) L'Analyse Statistique Bayesienne. Paris: Economica.
Robert, C.P. (1994) The Bayesian Choice. New York: Springer-Verlag.
Spiegelhalter, D.J., Thomas, A. and Best, N.G. (1999) WinBUGS User Manual. MRC Biostatistics Unit.

Other credits in programs

MATH22/S	Deuxième licence en sciences mathématiques (Statistique)	(2 credits)
STAT2MS	Master en statistique, orientation générale, à finalité spécialisée	(2.5 credits)
STAT3DA/B	diplôme d'études approfondies en statistique (biostatistique et épidémiologie)	(2.5 credits)
STAT3DA/E	diplôme d'études approfondies en statistique (statistique et économétrie)	(2.5 credits)
STAT3DA/M	Diplôme d'études approfondies en statistique (méthodologie de la statistique)	(2.5 credits)
STAT3DA/P	diplôme d'études approfondies en statistique (pratique de la statistique)	(2.5 credits)