Generalized linear models, spring 2009

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Lecturer

Juha Karvanen

Scope

6 cu + optional practical work (harjoitustyö) of 2 cu

Harjoitustehtävät, tentin ja harjoitustyön voi tehdä myös suomeksi.

Type

Advanced studies.

Description

Generalized linear models are an extension of the usual linear model, where the response variable may be discrete or have a skew distribution. The course covers the generic likelihood-based estimation and test theory of generalized linear models. The most important special cases, like logistic and log-linear models, are treated in more detail.

The course will be a balanced mixture of statistical theory and practical data analysis. R (http://www.r-project.org) is used for data analysis and simulations. Examples from application areas, such as epidemiology and physics, will be presented.

Prerequisites

- Basics concepts of
  - mathematical analysis (derivatives and integrals)
  - matrix algebra (up to multiplication and inversion of matrices)
  - probability (random variables, standard distributions, expectation, variance, independence)
  - statistical inference (maximum likelihood, hypothesis testing).
- Knowledge of linear models is also useful.

Course material

Registration at the first lecture

Lectures

Period IV. First lecture on Tuesday 2009-03-10. Easter holiday: no lectures Tuesday 2009-04-14 and Wednesday 2009-04-15. Last lecture on Wednesday 2009-04-29.

Day	Time	Place
Tuesday	14-16	B120 (Exactum)
Wednesday	16-18	C323 (Exactum)

Two hours of exercise classes per week.

Exercises

First exercises on Tuesday 2009-03-10.

Day	Time	Place	Instructor
Tuesday	16 - 18	B120	Juha Karvanen

Course exam

Day	Time	Place
Tuesday 2009-05-12	14.00 - 16.00	B120 (Exactum)

Practical work (harjoitustyö)

Two extra credits can be gained by completing a practical work by the end of May 2009. The work can be, for example, an analysis of a suitable data set or a simulation study. Some potential topics will be presented in the lectures.