UCL Institut de statistique

STAT

STAT3222	Survival analysis

[15h] 3 credits

This course is taught in the 1st semester

Teacher(s):   Ingrid Van Keilegom
Language: english
Level: 3rd cycle course

Aims

The aim is to familiarize the student with the basic concepts and models in survival analysis. Moreover, by making use of computer packages, the student will be able to solve real data problems. The course stresses more the methodology, the interpretation, and the mechanisms behind common models in survival analysis, and less the theoretical and mathematical aspects.

Main themes

The following concepts and models will be studied in this course :
- Right censoring, left truncation
- Some common parametric distribution functions in survival analysis
- Nonparametric estimation of basic quantities (Kaplan-Meier estimator of the survival distribution, Nelson-Aalen estimator of the cumulative hazard function,...)
- Hypothesis testing regarding the equality of two or more survival curves
- Proportional hazards models
- Parametric regression models / accelerated failure time models
- Frailty models

Content and teaching methods

Content
- Nonparametric estimation of basic quantities (Kaplan-Meier estimator of the survival distribution, Nelson-Aalen estimator of the cumulative hazard function,...), the development of some (asymptotic) properties of these estimators, and hypothesis testing regarding the equality of two or more survival curves
- Proportional hazards model (estimation of model components, hypothesis testing, selection of explanatory variables, model validation, ...)
- Accelerated failure time model (estimation of parameters in model, hypothesis testing, model selection, model validation,...)
- Frailty model (introduction, motivation, estimation of model components, ...)
Teaching methods
The course consists of lectures, and an individual project on computer.

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

Prerequisites
- The student should have a good knowledge of probability and statistics.
- Good knowledge of SAS or Splus (or any other advanced computer package) is required.
Evaluation
The evaluation consists of :
- an oral exam
- a project on computer, which consists of the analysis of real data.
Teaching materials
The course notes will be distributed during the first lecture.
Others
Professor : Ingrid Van Keilegom, phone : 010/47 43 30, e-mail : vankeilegom@stat.ucl.ac.be
References
Cox, D.R. and Oakes, D. (1984). Analysis of survival data, Chapman and Hall, New York.
Hougaard, P. (2000). Analysis of multivariate survival data. Springer, New-York.
Klein, J.P. and Moeschberger, M.L. (1997). Survival analysis, techniques for censored and truncated data, Springer, New York.
For more information:
http://www.stat.ucl.ac.be/cours/stat3222/index.html http://www.stat.ucl.ac.be/cours/stat3222/index.html

Other credits in programs

STAT3DA/B	diplôme d'études approfondies en statistique (biostatistique et épidémiologie)	(3 credits)	
STAT3DA/E	diplôme d'études approfondies en statistique (statistique et économétrie)	(3 credits)	
STAT3DA/M	Diplôme d'études approfondies en statistique (méthodologie de la statistique)	(3 credits)	
STAT3DA/P	diplôme d'études approfondies en statistique (pratique de la statistique)	(3 credits)	Mandatory