SYLLABUS DEL CORSO

Statistical Modelling III

2021-104R-StatMod-III

Learning objectives

The course "Hidden (Latent) Markov models with applications" introduces the theory of the latent Markov models for the analysis of longitudinal data. A deep insight into the underlying assumptions of the stochastic processes is provided. Basic and advanced parameterizations to formulate latent Markov models are also explained. Inferential procedures to estimate the model parameters are covered. During the course, case studies and applications are presented mainly by using the R library LMest.

Contents

- Basic features of the latent class model and introduction to the R package MultiLCIRT Multidimensional Latent Class (LC) Item Response Theory (IRT) Models

- Basic features of the latent Markov (LM) model and the Expectation-Maximization (EM) algorithm for model estimation. LM model formulation with covariates on the structural part

- Introduction to the R package LMest Latent Markov models for longitudinal continuous and categorical data

- Multivariate extension of the LM model, model formulation with covariates on the measurement model, model estimation with the EM algorithm

- Latent Markov model for continuous data.

Detailed program

Prerequisites

Teaching methods

Lectures: theory and applications on real and simulated data

Assessment methods

Textbooks and Reading Materials

Pennoni F. (2014). *Issues on the estimation of latent variable and latent class models, with applications in the social sciences*. Scholars' Press, Saarbücken. Website.

Bartolucci F., Farcomeni A., Pennoni F. (2013). *Latent Markov models for longitudinal data*, Chapman and Hall/CRC, Boca Raton.

Bartolucci, F., Farcomeni, A., Pennoni, F. (2014). Latent Markov Models: a review of a general framework for the analysis of longitudinal data with covariates (*with discussion*), *Test*, **23**, 433-465.

Semester

September 2021

Teaching language

English