Université de Neuchâtel
Faculté des sciences économiques
www.unine.ch/seco

COURSE DESCRIPTION 2009-2010

Multivariate Analysis

Objectives

This course is designed to broaden the student's understanding of the statistical processing of multivariate data. It should enable him or her to master both the theoretical background and the context of applications of multivariate analysis. At the end, the student should be able to apply the multivariate techniques presented in this course to his or her own research studies and to carry out real life applications with a critical appraisal of the results and conclusions. The main domains leading to multivariate data sets are: socio-economic surveys, biometrics, behavioural sciences, geographic data bases, demographic, marketing research.

Contents

1. Brief review of basics of statistics and matrix algebra.

2. Exploratory Multivariate Analysis: Principal axes techniques (singular value decomposition, principal component analysis, canonical analysis, simple and multiple correspondence analysis).

3. Exploratory Multivariate Analysis: Clustering techniques (hierarchical clustering, k-means and related methods, self organizing maps).

4. Links between the exploratory tools and some classical predictive methods such as multiple regression, discriminant analysis, regression trees.

5. Assessment methods that involve resampling schemes such as the *bootstrap* methods.

Eventually, since hand calculations are virtually impossible in this field, application examples will be performed with the aid of the software R and DtmVic (http://www.dtm-vic.com).

Evaluation

According curriculum 2009-2010 :

- E : 2-hour written test during the end of semester session of exams
- *Reexamination session (September) : 2h written test*

Textbooks

- L. Lebart, A. Morineau, K. Warwick (1984) *Multivariate Descriptive Statistical Analysis*, Wiley, (Wiley Series in Probability and Mathematical Statistics), New York
- L. Lebart, M. Piron, A. Morineau (2006) *Statistique Exploratoire Multidimensionnelle*, Dunod, 4ème édition, 480p *(in French)*

Characteristics

- 3 ECTS credits
- Compulsory course for master in statistics
- Autumn Semester
- Course : 2 hours
- Prerequisite : basics in statistics and linear algebra

Teaching team

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