Université de Neuchâtel

COURSE DESCRIPTION 2008-2009

- Faculté des sciences économiques
- www.unine.ch/seco

Advanced Regression Models

Characteristics

- 6 ECTS credits
- Compulsory course for master in statistics
- Autumn Semester
- Course : 2 hours / Exercises : 2 hours
- Evaluation : 1 final project
- Prerequisite : common basis in probability and statistics

Teaching Team

- *Prof. HES Jacques Zuber*
  Département des Technologies de l'Information et de la Communication (TIC),
  Haute École d'Ingénierie et de Gestion du Canton de Vaud,
  1, route de Cheseaux, 1401 Yverdon-les-Bains,
  ☎+41 24 557 64 59- ✉ jacques.zuber@unine.ch

- *Fabien Guggemos,* teaching assistant
  Institut de statistique
  Pierre-à-Mazel 7, CH-2000 NEUCHATEL
  ☎+41 32 718 13 80 - ✉ fabien.guggemos@unine.ch

Objectives

Motivating, introducing and studying a variety of regression models. Integrating the practice and theory to case studies. Carrying out statistical data analysis and summarizing and interpreting statistical software outputs. Introducing some themes of modern modelling and analytical techniques such as model selection, smoothing and shrinkage methods.

Contents

This course will cover different topics:

- motivating examples and overview;
- linear regression models;
- least squares estimators (LSEs);
- inference;
- diagnostics and transformations;
- variable selection;
- generalised linear models (logistic regression models, Poisson regression models);
- smooth regression;
- shrinkage method.

Exercises

Integrating the theory presented in class to solve practical or theoretical problems.

Textbooks

- Davison, A. C. (2003). *Statistical Models*. Cambridge University Press: Cambridge

- Draper, N. R. & Smith, H. (1998). *Applied Regression Analysis* (Third Edition). John Wiley & Sons: New-York
- Faraway, J. J. (2004). *Linear Models with R*. Chapman & Hall/CRC: Boca Raton, Florida
- Harrell, F. E. Jr (2001). *Regression Modelling Strategies: With Applications to Linear Models, Logistic Regression, and Survival Analysis*. Springer Verlag: New-York
- Hosmer, D. W. & Lemeshow, S. (2000). *Applied Logistic Regression* (Second Edition). John Wiley & Sons: New-York
- McCullagh, P. & Nelder, J. A. (1989). *Generalized Linear Models* (Second Edition). Chapman & Hall/CRC: Boca Raton, Florida
- Nolan, D. & Speed, T. (2001). *Stat Labs, Mathematical Statistics Through Applications*. Springer Texts in Statistics: New-York