

IE 508 Statistical Inference, Spring 2009

Instructor: Wolfgang Hörmann

Objective: This course will give the mathematical basis necessary to understand the classical approaches of statistical inference. In parallel we will apply the learned methods to data sets using the statistical package “R”.

Week 1: Introduction to R; revision of applications using confidence intervals and tests

Week 2: The likelihood principle and sufficient statistics

Week 3: Maximum likelihood estimation and Fisher information

Week 4: Properties of MLE and Cramer-Raos’s lower bound

Week 5: The Neyman-Pearson approach and the general likelihood ratio test

Week 6: Applications of the likelihood ratio test

Week 7: Linear Models, the general framework

Week 8: Linear Models, Regression Applications

Week 9: Linear Models, Analysis of Variance

Week 10: Applied Statistics, Model Assumptions vs Data Mining Paradigma

Week 11: Generalized linear Models and logistic regression

Text Book: I was not able to find a book that covers the mathematical and the applied aspects of the lecture. I have produced some sort of “lecture notes” and will try to improve them together with you.

Adelchi Azzalini: Statistical inference : based on the likelihood

(we will use for the mathematical statistics part but we are going to cover only parts of that book.)

R.E. Walpole and R.H. Meyers: Probability and Statistics for Engineers and Scientists

(should be useful for most of the applied examples)

Course Hours and Rooms:

Monday 12.00 to 14.00 (M3120)

Thursday 11.00 to 13.00 (M2231)

Homework: Every week there will be a PS with both mathematical questions and computer assignments.

Quizzes: There will be no quizzes.

Grading: mid-term tests (25 %) , final exam (40 %) and a data-project (15%). Computer assignments and other assignments (10%), attendance and in-class activities (10%)