

# PH.D. Course "Theoretical Statistics"

## short title: Liese-Kurs Part II

Lecturer: Silvelyn Zwanzig

### 1 General

The course is for Ph. D. students and for very interested master students.

The lecture course is based on the book:

"Statistical Decision Theory: Estimation, Testing, Selection"

by Friedrich Liese and Klaus J. Miescke

Springer : ISBN 978-0-387-73193-3, e-ISBN: 978-0-387-73194-0

The part I (Chapter 1-5 of the course book) was given in spring 2009. It is possible (but hard) to take part at the second part of the course and to read these first chapters by your own.

#### 1.1 Some words to the book:

The authors wrote a new abstract mathematical book on theoretical statistics. But the abstraction are done only up to necessary level and not more as necessary. The decision theoretical approach includes test and selection problems as well as estimating problems . The book contains an pragmatic approach to Bayes theory. This book delivers a good compromise between German style (theoretically oriented such that the proofs are easy - but it is impossible to find the result) and the American textbook style (easy to find the result - but complicated to find the closed proof too).

### 1.1.1 Comparison to other books. Additional literature:

Books which are more abstract than the book of Liese and Miescke:[5] [6], [8]

Books which are more methodical than the book of Liese and Miescke: [4], most of the classical textbooks on estimation theory, parts of [10]

The book of Liese and Miescke includes most parts of the following books: [1], [2], [7], [9], [3]

## 2 Organization of the lecture course

The course will organized as follows:

Part I ( Chapter 1- 5) 7.5 hp, Period 4 of 2008/09, kurskod: 1MS011

Part II (Chapter 6 - 9) 7.5 hp Period 1 of 2009/10, kurskod: open

### Prerequisites

The contents of the courses:

Mathematical Statistics MS 013 (Probability theory MN2, Inference MN2)

Measure theory

### 2.1 Part II

Course will be a mixture of a lecture course and a reading course. 6 lectures will be given by the teacher. In the time between the lectures students have to read and to solve problems.

#### Examination:

Obligatory home assignments:

Homework I related to Chapter 6

Homework II related to Chapter 7

Homework III related to Chapter 8

Oral presentation in a last lecture in January 2010

### 2.1.1 Time-Table (preliminary)

1. Lecture: Tuesday 13/10, 15-17 Polacks 2215  
Chapter 6, 6.1, 6.2
2. Lecture: Tuesday 20/10 15-17 Polacks 2145  
Chapter 6.3 ff  
- reading part: rest Chapter 6
3. Lecture: Tuesday 3/11 15-17 Polacks 2145  
Chapter 7.1,-7.3.  
- reading part: rest of Chapter 7
4. Lecture: Tuesday 24/11 15-17 Polacks 2344  
Chapter 8, 8.1-8.4
5. Lecture: Tuesday 8/12 15-17 Polacks 2145  
Chapter 8 cont.  
- reading part: rest Chapter 8
6. Lecture: Tuesday 15/12 15-17 Polacks 2145  
Chapter 9
7. Lecture: January  
talks  
Summary, discussion, Solution of home works

## References

- [1] Akahira, M and Takeuchi, K. (1981) Asymptotic Efficiency of Statistical Estimators , Springer New York

- [2] Bandorf-Nielsen, O. (1978) Information and Exponential Families, Wiley New York
- [3] Bickel, P.J. Klaassen, C.A.J. Ritov, Y. and Wellner, J.A. (1993) Efficient and Adaptive Estimation for Semiparametric Models, John Hopkins University Press, Baltimore
- [4] Bunke, H., Bunke, O. (1987) Statistical Methods of Modelbuilding, Wiley
- [5] Chencov, N.N. (1982) Statistical Decision Rules and Optimal Inference. Trans Math. Monographs, 53
- [6] Le Cam, L. (1986) Asymptotic Methods in Statistical Decision Theory, Springer New York
- [7] Lehmann E.L., Romano, J.P. (2005) Testing Statistical Hypotheses, Springer New York
- [8] Strasser, H. (1985) Mathematical Theory of Statistics, Walter de Gruyter, Berlin
- [9] van der Vaart, A.W. (1998) Asymptotic Statistics, Cambridge Press
- [10] Witting, H. and Mueller Funk, U. (1995), Mathematische Statistik II, Teubner, Stuttgart