5. Herbstkolloquium
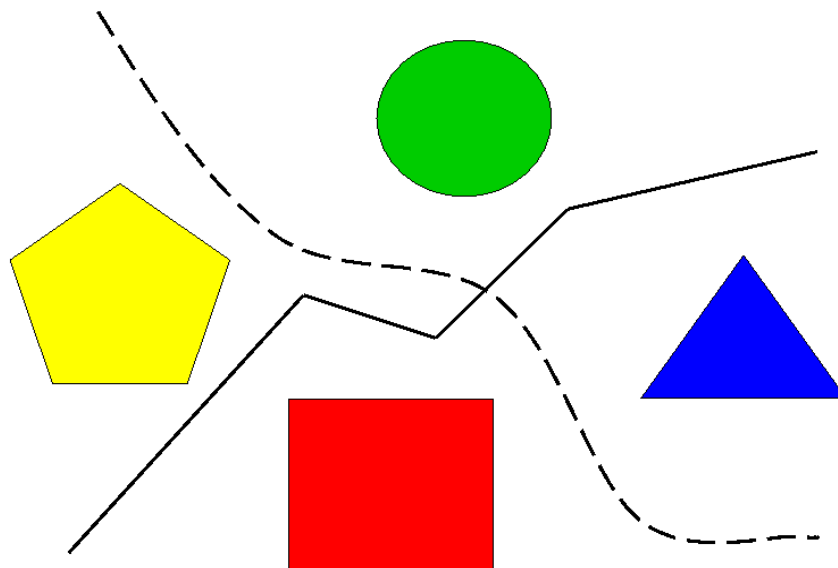## des Graduiertenkollegs
"Statistische Modellbildung"

Statistische Modellbildung

Zu diesem Kolloquium wird eingeladen
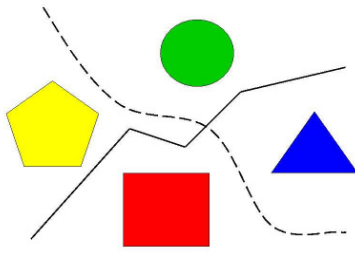
Freitag / Samstag, 28./29. November 2008

UNIVERSITÄTSKOLLEG BOMMERHOLZ
- Lehr- und Weiterbildungsstätte der Universität Dortmund -
Bommerholzer Straße 60, 58456 Witten.
(Tel.: ++49 (0)2302 / 39 60, Fax: ++49 (0)2302 / 39 63 20)

5. Herbstkolloquium
des Graduiertenkollegs
"Statistische Modellbildung"

Statistische Modellbildung

Freitag, 28. November 2008

Abfahrt nach Witten: ab Dortmund gegen 14.00 Uhr

Vortragsprogramm I

15.30 h   **Begrüßung**
             Prof. Dr. Joachim KUNERT

15.45 h   **Dr. Oskar Maria BAKSALARY**   **Along Route 66 with Götz Trenkler**

             Faculty of Physics, Adam Mickiewicz University,
             Poznań, Poland

16.30 h   **Prof. Dr. Bernhard SCHIPP**   **Self exciting extreme value models with**
                                                    application to stock market crashes

             Fakultät Wirtschaftswissenschaften, Technische
             Universität Dresden

17.15 h   **Presentation of a Festschrift for Prof. Dr. Götz Trenkler**

Diskussionen zu den Projektbereichen

19.00 h   **Posterausstellung:**
             Präsentation der Dissertationsprojekte im Kolleg, Diskussion in Arbeitsgruppen

Samstag, 29. November 2008

Vortragsprogramm II

9.00 h   **Prof. Dr. Wilfried SEIDEL**   **Likelihood methods in mixture analysis**
Fakultät für Wirtschafts- und
Sozialwissenschaften, Helmut-Schmidt-
Universität Hamburg, Germany

9.45 h   **Dr. Bettina GRÜN**   **Identification and estimation of finite mixtures**
Department für Statistik und Mathematik,   **of generalized linear models**
Wirtschaftsuniversität Wien, Austria

10.30 h   *Pause*

Vortragsprogramm III

11.00 h   **Prof. Dr. Werner PLOBERGER**   **Preaveraging estimators for realized volatility**
Department of Economics, Washington
University in St. Louis, U.S.A.

11.45 h   **Dr. Hugo MARURI-AGUILAR**   **Smooth polynomial interpolators**
Department of Statistics, London School of
Economics, England

12.30 h   *Pause*

13:15   *Gruppenfoto auf der Terrasse (wetterabhängig) /*

Vortragsprogramm IV

13:30 h   **Dr. Katarzyna FILIPIAK**   **On optimal circular designs under an**
Department of Mathematical and Statistical   **interference model**
Methods, Poznań University of Life Sciences,
Poland

14:15 h   **Dr. Martina ERDBRÜGGE**   **Statistical applications in**
Vodafone D2 GmbH, Düsseldorf   **telecommunications**

15.00 h   *Abschlussbesprechung und Diskussion*

ALONG ROUTE 66 WITH GÖTZ TRENKLER

Oskar Maria Baksalary
Faculty of Physics, Adam Mickiewicz University, Poznań,, Poland

Within the talk entitled "Corollary 6 - Route 66 to the structure of square matrices", given at the Mt-Triad 2005 - Three Days Full of Matrices (Będlewo, Poland, 3-5 March 2005), Trenkler demonstrated the usefulness of Corollary 6 in Hartwig and Spindelböck (1984) to consider the properties of several matrix classes. These classes included, for instance, oblique and orthogonal projectors as well as EP and normal matrices. In the present paper, Route 66 is followed and some "points of interest" are explored. As a result, the usefulness of Corollary 6 to deal with further classes of matrices is shown, with particular attention paid to generalized and hypergeneralized projectors, introduced by Groß and Trenkler (1997).

References
Hartwig, R.E. and Spindelböck, K., (1984). Matrices for which A* and A† commute. *Linear and Multilinear Algebra* 14, 241-256.
Groß, J. and Trenkler, G., (1997). Generalized and hypergeneralized projectors. *Linear Algebra and its Applications* 264, 463-474.

The talk is dedicated to Professor Trenkler on the occasion of his 65th birthday.

STATISTICAL APPLICATIONS IN TELECOMMUNICATIONS

Martina Erdbrügge
Vodafone D2 GmbH, Düsseldorf

Facing increasing customer's quality expectations and a challenging market situation with increasing competition in telecommunications industry, management support and information systems are a key success factor. In this talk, a brief introduction to statistical applications at Vodafone Germany is given, covering methods for assessing and summarising quality KPIs as well as churn forecasting and controlling methods as part of management information systems. In addition, an overview of further fields of statistical applications in telecommunications industry with relation to network optimisation as well as new and upcoming services is given.

ON OPTIMAL CIRCULAR DESIGNS UNDER AN INTERFERENCE MODEL

Katarzyna Filipiak
Department of Mathematical and Statistical Methods, Poznań University of Life Sciences, Poland

It is known (Druilhet, 1999) that under an interference model with fixed neighbor effects, circular neighbor balanced designs (CNBDs) are universally optimal. In this talk we show universal optimality of such designs under the mixed interference model. In some cases when CNBD cannot exist, we identify

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circular partially neighbor balanced designs as universally optimal under the fixed and mixed interference models or we characterize E-optimal designs.

References
Druilhet, P. (1999). Optimality of circular neighbor balanced design. *J. Statist. Plann. Inference* 81, 141-152

IDENTIFICATION AND ESTIMATION OF FINITE MIXTURES OF GENERALIZED LINEAR MODELS

Bettina Grün
Department für Statistik and Mathematik, Wirtschaftsuniversität Wien, Austria

Generalized linear models have become a standard technique in the statistical modelling toolbox for investigating relationships between variables. The assumption of homogeneity of regression coefficients over all observations can be relaxed by incorporating generalized linear models into the finite mixture framework. The model class consisting of finite mixtures of generalized linear models is presented. Model identification is discussed and special attention is given to identifiability problems which arise in addition to those already known for mixtures of distributions. Details on model estimation are outlined, the implementation in the R extension package flexmix is described and the application is illustrated on several examples.

SELF EXCITING EXTREME VALUE MODELS WITH APPLICATION TO STOCK MARKET CRASHES

Rodrigo Herrera and Bernhard Schipp
Fakultät Wirtschaftswissenschaften, Technische Universität Dresden

We demonstrate the usefulness of Extreme value Theory (EVT) to evaluate magnitudes of stock market crashes and provide some extensions. A common practice in EVT is to compute either unconditional quantiles of the loss distribution or conditional methods linking GARCH models to EVT. Our approach combines
self-exciting models for exceedances over a given threshold with a marked dependent process for estimating the tail of loss distributions. The corresponding models allow to adopt ex-ante estimation of two risk measures in different quantiles to assess the expected frequency of different crashes of important stock market indices.

The paper concludes with a backtesting estimation of the magnitude of major stock market crashes between 1987 and 2008. The results show that this approach provides better estimates of risk measures than the classical methods and is moreover able to use available data in a more efficient way.

PREAVERAGING ESTIMATORS FOR REALIZED VOLATILITY

Taesuk Lee and Werner Ploberger
Department of Economics, Washington University in St. Louis

Preaverage estimators use the sum of squares of smoothed returns as an estimator for the realized volatility. We analyze linear combinations of these estimators and show that these estimators have several advantages. We will show that they have favourable asymptotic properties even when the microstructure noise is not independent from the "true" returns. Hence these estimators are useful when there are a large number of zero returns.

SMOOTH POLYNOMIAL INTERPOLATORS

Hugo Maruri-Aguilar and Henry Wynn
Department of Statistics, London School of Economics, England

Splines are piecewise polynomial functions, known to minimise smoothness properties in one and higher dimensions. However, splines are not always continuously differentiable and sometimes it might be difficult to construct splines over irregular design regions.

Smooth saturated interpolators can be constructed by first extending the algebraic monomial basis and then minimising over a given region a measure of smoothness with respect to the free parameters in the extended basis. This method allows a polynomial approximation to splines and allows for a flexible smoothing region. The resulting model shares all the advantages of polynomial models (linearity in parameters and in observations), while at the same time is smooth and thus close to a spline model.

As an example, this technique is applied to sensitivity analysis of computer simulations. Future work pointing to smooth Hermite interpolation is also discussed.

LIKELIHOOD METHODS IN MIXTURE ANALYSIS
Wilfried Seidel
Fakultät für Wirtschafts- und Sozialwissenschaften, Helmut-Schmidt-Universität Hamburg, Germany

Classical mixture models consist of two parts: A fixed parametric base model and a nonobservable "mixing distribution". If the focus is on analyzing the mixing distribution (in contrast to simply achieving a better data fit), identifiability and robustness are important issues.

Likelihood methods for obtaining information about the mixing distribution will be considered: Likelihood estimation (both parametric and nonparametric, depending on the size and structure of the considered space of mixing distributions) as well as model selection via likelihood ratio testing. Basic concepts will be discussed.

The flexibility of mixture models may result in "local overfitting". As a consequence, the likelihood function may be unbounded or may have very large "spurious" local maxima. These phenomena cause both conceptional and computational difficulties in likelihood estimation. Likelihood ratio tests are affected, too. The problems will be analyzed and possible solutions will be outlined.

5. Herbstkolloquium des Graduiertenkollegs "Statistische Modellbildung"
Fifth Autumn Symposium of the Research Training Group "Statistical Modelling"
28./29. November 2008 / *November 28th & 29th, 2008*

Abstracts

Gruppenfoto 4. Herbstkolloquium, 23./24. November 2007 *Participants of the 4th Autumn Symposium, November 23/24, 2007*