

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Statistical Inference for Complex Time Series Data

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ABSTRACT. During recent years the focus of scientific interest has turned from low dimensional stationary time series to nonstationary time series and high dimensional time series. In addition new methodological challenges are coming from high frequency finance where data are recorded and analyzed on a millisecond basis. The three topics “nonstationarity”, “high dimensionality” and “high frequency” are on the forefront of present research in time series analysis. The topics also have some overlap in that there already exists work on the intersection of these three topics, e.g. on locally stationary diffusion models, on high dimensional covariance matrices for high frequency data, or on multivariate dynamic factor models for nonstationary processes. The aim of the workshop was to bring together researchers from time series analysis, nonparametric statistics, econometrics and empirical finance to work on these topics. This aim was successfully achieved and the workshops was very well attended.

Mathematics Subject Classification (2010): 62M10.

Introduction by the Organisers

The workshop *Statistical Inference for Complex Time Series Data*, organised by Rainer Dahlhaus (Heidelberg), Oliver Linton (Cambridge), Wei-Biao Wu (Chicago) and Qiwei Yao (London), was held in 22-28 September 2013. The workshop was well attended with 51 participants with broad geographic representation from Europe, Australia, Canada and USA. The participants formed a nice blend of researchers with various backgrounds including statistics, probability, machine

learning and econometrics. A considerably large proportion of the participants were early career academics, post-doctoral researchers and some PhD.

29 talks of varying lengths were delivered during the five days. The talks were given by both leading experts in the field as well as by up-coming young scientists. In addition, there were seven 10 minute sessions with title “People and Topics” which featured short presentations on ongoing research projects and brief introductions on themselves of young researchers. Participants found those short presentations informative and effective.

There were several major themes in the various sessions, including local stationary time series models, high-dimensional modeling, high-frequency data, volatility estimation in finance, change-point detection for dependent data, and GARCH models. Overall the meeting generated a great deal of discussion and often smaller groups of people met in the evenings for additional spontaneous lectures and detailed discussions. A number of important research contacts were made which we expect to stimulate new collaborative research projects.

In addition to the excellent scientific exchanges, the traditional Wednesday afternoon hike was blessed by excellent weather and delicious black-forest cake. It is important to note that this social event also has a high impact on scientific exchange and on stimulating new collaborative research. Those participants who had never visited Oberwolfach before, left with a clear impression on the MFO and its high valued contribution to the global mathematical community. There was also a strong consensus that the theme “Complex Time Series” should appear more regularly in the Oberwolfach workshop program to reflect the rapid development in mathematics and statistics driven by this information age.

Workshop: Statistical Inference for Complex Time Series Data**Table of Contents**

Alexander Aue (joint with Haoyang Liu, Debashis Paul)	
<i>The Marčenko–Pastur Law for Time Series</i>	2753
Richard A. Davis (joint with Thomas Mikosch, Oliver Pfaffel)	
<i>Largest eigenvalues of the sample covariance matrix for p-variate time series with heavy-tails</i>	2755
Herold Dehling (joint with Roland Fried, Aeneas Rooch, Murad Taqqu, Martin Wendler)	
<i>Asymptotic distribution of some robust change-point tests for time series</i>	2757
Paul Doukhan	
<i>Weak dependence, models limit theory and an application to DNA modeling</i>	2760
Michael Eichler	
<i>Graphical time series models</i>	2763
Jianqing Fan (joint with Yuan Liao)	
<i>Incidental Endogeneity in high-dimensional statisticse</i>	2765
Jürgen Franke (joint with Mark Fiecas, Rainer von Sachs, Joseph Tadjuidje-Kamgaing)	
<i>Stable estimates for high-dimensional hidden Markov models</i>	2766
Piotr Fryzlewicz	
<i>On multi-zoom autoregressive time series models</i>	2769
Yulia R. Gel	
<i>Functional Ridge Regularization</i>	2772
Wolfgang Karl Härdle (joint with Yan Fan, Weining Wang, and Lixing Zhu)	
<i>Composite Quantile Regression for the Single-Index Model</i>	2775
Jean Jacod (joint with Viktor Todorov)	
<i>Efficient estimation of integrated volatility in presence of jumps with activity bigger than 1</i>	2778
Claudia Kirch (joint with John A D Aston)	
<i>Change-Points in High-Dimensional Settings</i>	2781
Clifford Lam (joint with Pedro CL Souza)	
<i>Estimation of spatial weight matrices in large spatial lag/error panels</i> ..	2784
Anne Leucht (joint with Michael H. Neumann and Jens-Peter Kreiß)	
<i>Testing for GARCH(1,1) model specification</i>	2786

Alexander Lindner (joint with Serge Cohen)	
<i>Inference for Lévy driven continuous time moving average processes</i> . . .	2787
Enno Mammen (joint with Christian Conrad)	
<i>Asymptotics for the Parametric GARCH-in-Mean Model</i>	2791
Maria Elvira Mancino (joint with Imma Curato, Maria Cristina Recchioni)	
<i>Boundary Spot Volatility Estimation using the Laplace Transform</i>	2794
Thomas Mikosch (joint with Richard A. Davis, Yuwei Zhao)	
<i>The extremogram and the ex-periodogram</i>	2795
Per A. Mykland (joint with Dan Christina Wang and Lan Zhang)	
<i>Forecasting Volatility using Leverage Effect</i>	2796
Mark Podolskij (joint with Andreas Basse-O'Connor, Raphael Lechieze-Rey)	
<i>Limit theorems for Lévy moving average processes</i>	2796
Philip Preuß(joint with Ruprecht Puchstein, Holger Dette)	
<i>Detection of multiple structural breaks in multivariate time series</i>	2798
François Roueff (joint with Andrés Sánchez-Pérez, Christophe Giraud)	
<i>Adaptive online forecasting of a locally stationary time varying autoregressive process</i>	2801
Rainer von Sachs (joint with Jean-Marc Freyermuth)	
<i>Structured wavelet estimation of time-varying spectra</i>	2804
Howell Tong (joint with Yingcun Xia)	
<i>Feature Matching in Time Series Modelling</i>	2807
Mathias Vetter (joint with Philip Preuß)	
<i>Discriminating between long-range dependence and non stationarity</i>	2809
Michael Vogt (joint with Holger Dette)	
<i>Detecting Smooth Changes in Locally Stationary Processes</i>	2811
Yazhen Wang (joint with Donggyu Kim)	
<i>Large Volatility Matrix Estimation for High-Frequency Financial Data</i> .	2814
Han Xiao (joint with Wei Biao Wu)	
<i>Simultaneous Inferences on Sample Covariances</i>	2815
Zhou Zhou	
<i>Heteroscedasticity and autocorrelation robust structural change detection</i>	2817