Statistics and Econometrics Seminars

Joint organization by
ORSTAT, Faculty of Economics and Business and the Statistics Research Group,
Faculty of Science; Leuven Statistics Research Center

KU LEUVEN

All seminars take place from 12-13h in room HOGM 02.10, Naamsestraat 69, Leuven, except for 11 May, KOL00.04 (Deberiotstraat 32).

23 Feb 2017 **Howard Thom** (Bristol University). State-structure selection in disease progression and cost-effectiveness decision analytic modelling.

9 March 2017 **Léopold Simar** (Université catholique de Louvain). Nonparametric estimation of efficiency in the presence of environmental variables.

16 March 2017 **Vanessa Berenguer-Rico** (University of Oxford). Testing for normality in robust regressions.

23 March 2017 **Mogens Forsgerau** (Technical University of Denmark). Generalized entropy models.

30 March 2017 **Ingrid Van Keilegom** (KU Leuven). Estimation in measurement error problems under minimal conditions on the distribution of the signal and the noise.

20 April 2017 **Tim van Erven** (Leiden University). Adapting to the distribution of the data in online sequential prediction.

27 April 2017 **Jörg Rieskamp** (University of Basel). TBA

4 May 2017 **Daniel Vogel** (University of Aberdeen). Detecting scale changes using pairwise differences.

11 May 2017 **Anders Bredahl Kock** (Aarhus University). Multiarmed bandits and optimal dynamic treatment allocation.

18 May 2017 **Chris Rose** (Toulouse School of Economics). Inference on social effects when the network is sparse and unknown.

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Dr. Howard Thom

Bristol University, U.K.

"State-structure selection in disease progression and cost-effectiveness decision analytic modelling"

Thursday, February 23, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob and FWO-WOG ATMS

Abstract. Markov multi-state models are commonly used to model disease progression and also to inform cost-effectiveness decision making. However, the choice of states used to categorize a continuous measure of disease severity can be uncertain and different choices can lead to different predictions and decision recommendations. Different state-structures aggregate the data differently so cannot be compared using likelihood based techniques, such as Akaike Information Criterion (AIC) or Focused Information Criterion (FIC), as the likelihoods are on different scales. We present two methods to compare state structures that each define a common dataset on which to conduct the comparison.
Our first method uses the recently developed Difference in Restricted AIC (DRAIC) that modifies the AIC to compare models fit to overlapping datasets on the data that they share. We illustrate this method with an application to disability progression modelling in psoriatic arthritis. Our second method defines models with simpler state-structures as constrained versions of a more complex model. We can then test these constraints on data of the complex model using standard model selection criteria. We illustrate this method with an application to cost-effectiveness modelling of antidepressant treatment by baseline severity in depression and to the psoriatic arthritis example.
We will conclude with a comparison of these methods and discussion of future directions for research.
This is joint work with C.Jackson, L. Sharples, D. Commenges, N.J. Welton.

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Prof. Dr. Léopold Simar

Université catholique de Louvain

"Nonparametric estimation of efficiency in the presence of environmental variables"

Thursday, March 9, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob and FWO-WOG ATMS

Abstract. This paper demonstrates that standard central limit theorem (CLT) results do not hold for means of nonparametric conditional efficiency estimators, and provides new CLTs that do hold, permitting applied researchers to estimate confidence intervals for mean conditional efficiency or to compare mean efficiency across groups of producers along the lines of the test developed by Kneip et al. (JBES, 2016). The new CLTs are used to develop a test of the ŞseparabilityŤ condition that is necessary for second-stage regressions of efficiency estimates on environmental variables. We show that if this condition is violated, not only are second-stage regressions difficult to interpret and perhaps meaningless, but also first-stage, unconditional efficiency estimates are misleading. As such, the test developed here is of fundamental importance to applied researchers using nonparametric methods for efficiency estimation. Our simulation results indicate that our tests perform well both in terms of size and power. We present a real-world empirical example by updating the analysis performed by Aly et al. (R. E. Stat., 1990) on U.S. commercial banks; our tests easily reject the assumption required for two-stage estimation, calling into question results that appear in hundreds of papers that have been published in recent years.
Joint work with Cinzia Daraio and Paul W. Wilson

Main References:
Daraio, C., Simar, L. and P.W. Wilson (2016), Nonparametric Estimation of Efficiency in the Presence of Environmental Variables, Discussion paper 2016/27, ISBA, UCL.
Kneip, A., Simar, L. and P.W. Wilson (2015), When bias kills the variance: Central Limit Theorems for DEA and FDH efficiency scores, Econometric Theory, 31, 394Ű422.
Kneip, A., Simar, L. and P.W. Wilson (2016), Testing Hypothesis in Nonparametric Models of Production, Journal of Business and Economic Statistics, 34:3, 435Ű456.

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Prof. Dr. Vanessa Berenguer-Rico

University of Oxford

"Testing for normality in robust regressions"

Thursday, March 16, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract. In this paper we develop a normality test for robust regressions. The test is based on the third and fourth moments of robustified (truncated) residuals and it allows for both stationary and non-stationary regressions. We show that the test statistic is asymptotically chi-square. The statistical analysis of the test reveals that the rescaling of the moment based statistic is case dependent, i.e., it depends on the estimation method being used. Hence, using the standard least squares normalizing constants in robust regressions will lead to incorrect inferences. This result is obtained by extending a recent theory of weighted and marked empirical processes to a situation where the marks are functions of residuals. By doing so, we also contribute to the literature on statistical functionals of residuals expressed as integrals with respect to their empirical distribution functions. In our context the integrands can be unbounded provided that the underlying distribution meets certain moment condition. Whereas this paper focuses on normality testing, we note that the framework is general enough to handle a variety of specification tests.

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Prof. Dr. Mogens Forsgerau

Technical University of Denmark

"Generalized entropy models"

Thursday, March 23, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract. This paper introduces generalized entropy models (GEM) and shows their usefulness for constructing and estimating demand systems for market shares. GEM have a firm foundation in rational behavior, they handle easily complex substitution patterns, they can be estimated by linear regression which allows fixed effects to be included. Not least, large models can be estimated using standard software in essentially zero time.

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Prof. Dr. Ingrid Van Keilegom

ORStat, KU Leuven

"Estimation in measurement error problems under minimal conditions on the distribution of the signal and the noise"

Thursday, March 30, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob and FWO-WOG ATMS

Abstract. In this presentation I will talk about two research problems related to the identifiability and estimation in measurement error problems. We like to make as little assumptions as possible on the error and on the variable that is subject to measurement error, and especially we do not want to impose the heavy assumption that the variance of the error is known, which is a common assumption in the literature.
For the first project, let X denote an unobservable continuous variable with compact support (like e.g. a covariate in a regression model), and let W be its mismeasured version. We assume the classical additive model $W = X + U$, where the error U is independent of X and is normally distributed with mean zero and *unknown variance* σ^2. No further assumptions are made regarding X and U. Under this model we like to identify and estimate the variance σ^2. We will do this by approximating the density of X by a linear combination of Beta densities, and by letting the number of densities go to infinity when the sample size grows. In this way we can show that the problem is identifiable, we develop an estimation procedure, asymptotic theory and a detailed simulation study.
For the second project, we are interested in the estimation of the boundary (or frontier) c of a variable X with support say $[c, \infty)$. The variable X is again observed with noise, i.e. we observe $W = X + U$, where U and X are again assumed to be independent, and this time we assume that the distribution of U is *completely unknown* apart from the fact that its density is known to be symmetric. We show that the boundary c can be identified under these conditions, and propose an estimation procedure, which we illustrate in a simulation study.

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Prof. Dr. Tim van Erven

Leiden University

"Adapting to the distribution of the data in online sequential prediction"

Thursday, April 20, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob and FWO-WOG ATMS

Abstract. In statistical learning, the limits of minimax analysis are pretty well understood. For example, in classification it is known from the work of Tsybakov and others, that it is possible to predict much better than the minimax rate in many common cases where the data distribution is 'easy', as characterized by the so-called margin condition. Adaptive methods that automatically exploit the margin condition are possible, although they require automatic tuning of a regularization parameter, which is theoretically complicated.
In contrast to statistical learning, most work in online sequential prediction is still based only on minimax analysis. I will present recent work in which we develop a theory of 'easy data' for this setting. We introduce an adaptive method called MetaGrad, which automatically determines the optimal regularization parameter from the data. MetaGrad's performance is bounded in terms of a new data-dependent measure of variance, which automatically recovers the best-known rates in all known cases, and implies fast rates in a new class of cases that we characterize by an online version of the margin condition.
This is joint work with Wouter Koolen and Peter Grünwald.

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Prof. Dr. Jörg Rieskamp

University of Basel

"TBA"

Thursday, April 27 9, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract.

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KU LEUVEN

Prof. Dr. Daniel Vogel

University of Aberdeen

"Detecting scale changes using pairwise differences"

Thursday, May 4, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract. The mean of all pairwise differences is commonly referred to as Gini's mean difference. Rousseeuw & Croux (1993) propose to use the 1/4th sample quantile of all pairwise differences and call the resulting estimator Q_n. Both estimators are popular scale estimators that combine very good statistical properties with an intriguing conceptual simplicity. We consider these estimators in the context of change-point analysis. We review their efficiency and robustness properties and then construct CUSUM-type change-point test statistics based on Gini's mean difference and various sample quantiles of the pairwise differences.We use recent results on the asymptotics of U-statistics and U-quantiles for dependent data to derive critical values. The behavior of the tests is examined by means of numerical simulations, demonstrating their general superiority over the classical second-moments-based CUSUM test for detecting scale changes.
Joint work with C. Gerstenberger, M. Wendler.

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Prof. Dr. Anders Bredahl Kock

Aarhus University

"Multiarmed bandits and optimal dynamic treatment allocation"

Thursday, May 11, 2017
12.00–13.00h

Room **KOL00.04, Deberiotstraat 32, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract. We consider the treatment allocation problem via a multi armed bandit approach. As opposed to classical treatment allocation problems where a data set of some size n is supposed to be given and used to estimate treatment effects of a certain medical drug or economic policy we take the stance that the data arrives gradually. The policy maker thus faces a tradeoff between exploring which (out of potentially many) treatments is best and exploiting the knowledge gathered so far such that few suboptimal treatments are assigned. In practice the policy maker observes individual characteristics (covariates) of an individual prior to assigning a treatment and we show how to take these into account. Furthermore, data may arrive in batches or with delay and we show how to adjust our treatment policies to these settings. The policy maker may also be interested in the riskiness of a treatment and not only its expected effect. Finally, we show how information from previous studies can be taken into account when assigning a treatment. For each setting we prove upper bounds on the regret of our policy compared to the infeasible oracle that had known the best treatment in advance and assigned this. The rates entering the upper bounds are minimax optimal and we also prove upper bounds on the number of times suboptimal treatments are assigned by the proposed policy. The latter is important for ethical reasons as policies that assign too many bad treatments are not practically viable.

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Prof. Dr. Chris Rose

Toulouse School of Economics

"Inference on social effects when the network is sparse and unknown"

Thursday, May 18, 2017
12.00–13.00h

Room **HOGM 02.10, Naamsestraat 69, Leuven.**
Supporting research project: GOA-project FlexStatRob

Abstract. This paper considers models of social interaction when the underlying networks are unobserved but sparse and there are endogenous, contextual, and correlated effects. We accommodate prior knowledge on the sparsity pattern (group sparsity and partial knowledge on the links) and restrictions on the parameters. We provide results on identification, rates of convergence, model selection, and inference for the parameters and linear functionals in the high-dimensional paradigm. Inference is robust to identification and uniform over large classes of sparse identifiable parameters and data generating processes. Some results hold in finite samples. Our work extends Gautier and Tsybakov (2011,2014) to systems of high-dimensional structural equations with cross equation restrictions and group sparsity. For computational convenience, we only rely on convex programs.
Joint work with Eric Gautier.