ANNUAL REPORT 2006

Institut für Statistik
und Decision Support Systems
Universität Wien

Department of Statistics
and Decisions Support Systems
University of Vienna

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Wien, März 2007

Teaching and Research Activities

The main teaching duty of the Department of Statistics and Decision Support Systems comprises the education of students at the Faculty of Economics, Business Administration and Statistics as well as at the Faculty of Computer Science in the fields of Mathematics, Statistics, Operations Research, Econometrics, and several areas of Computer Science.

The Department offers undergraduate courses in Mathematics (Linear Algebra, Analysis, Discrete Mathematics) and Statistics for students of Management Science, Economics, Sociology, Applied Computer Science and Statistics. Graduate courses are offered in Mathematical Statistics, Applied Statistics, Operations Research (Optimization and Simulation), Applications of Computer Science, Econometrics and Stochastic Financial Mathematics.

Research is conducted in the areas of Mathematical Statistics; Applied Statistics, Computational Statistics; Probability Theory; Stochastic Methods of Financial Mathematics; Game Theory; Econometrics; Time Series Analysis; Global, Nonlinear, Combinatorial and Stochastic Optimization; Scheduling and Project Management; Modeling and Simulation of Complex Systems; Software Engineering; Information Systems and Statistical Methods in Theoretical Computer Science.

Faculty

Senior Faculty	
Bomze, Immanuel	Operations Research, Stochastic Modelling
Futschik, Andreas	Asymptotic Statistics, Applied Statistics, Bioinformatics
Gutjahr, Walter J.	Algorithms and Data Structures, Combinatorial Optimization, Reliability, Software Engineering
Pflug, Georg Ch.	Mathematical Statistics, Stochastic Optimization and Risk Management
Pötscher, Benedikt M.	Econometrics, Statistics and Time Series Analysis
Reschenhofer, Erhard	Time Series Analysis, Model Selection
Schachinger, Werner	Optimization, Probabilistic Analysis of Algorithms
Junior Faculty	
Baierl, Andreas	Statistical Methods in Quantitative Genetics
Frommlet, Florian	Applied Mathematics and Statistics
Klein, Irene	Stochastic Finance
Mirkov, Radoslava	Stochastic Optimization
Nickl, Richard	Probability and Statistics in Infinite Dimensions
Rubey, Martin	Combinatorics
Schneider, Ulrike	Statistics and Combinatorial Optimization
Wozabal, Nancy	Statistics and Optimiziation

Papers Published in 2006

Baierl, A.; Bogdan, M.; **Frommlet, F.**; **Futschik, A.**
On Locating Multiple Interacting Quantitative Trait Loci in Intercross Designs
Genetics **173**, 1693-1703 (2006)

Corcoran, J.N.; **Schneider, U.**, Schüttler, H.-B.
Perfect Stochastic Summation in High Order Feynman Graph Expansions
International Journal of Modern Physics C, **17** (11), 1527-1549 (2006)

Doerner, K., **Gutjahr, W. J.**; Hartl, R.F.; Strauß, C., Stummer. C.
Pareto Ant Colony Optimization with IP preprocessing in multiobjective project portfolio selection
European Journal of Operational Research **171**, 830-841 (2006)

Doerner, K.; **Gutjahr, W. J.;** Kotsis, G.; Polaschek, M.; Strauß, C.
Enriched workflow modelling and stochastic branch-and-bound
European Journal of Operational Research **175**, 1798-1817 (2006)

Frommlet, F,; Bogdan, M.; **Futschik, A.**
Power Analysis of Database Search using Multiple Scoring Matrices
Computational Statistics and Data Analysis **51** (3), 1656-1663 (2006)

Futschik, A.; Isogai, E.
On the Consistency of Kernel Density Estimates under Modality Constraints
Statistics and Probability Letters **76**, 431-437 (2006)

Guo, V.J.W.; **Rubey, M.**; Zeng, J
Combinatorial Interpretations of the q-Faulhaber and q-Salié Coefficients
Journal of Combinatorial Theory Series A **113** (7), 1501-1515 (2006)

Gutjahr, W. J.
On the finite-time dynamics of ant colony optimization
Methodology and Computing in Applied Probability **8**, 105-133 (2006)

Gutjahr, W. J.
Interaction dynamics of two reinforcement learners
Central European Journal of Operations Research **14**, 59-86 (2006)

Hochrainer, S.; Linneroth-Bayer, J.; Mechler, R.; **Pflug, G.**
Public sector financial vulnerability to disasters: The IIASA CATSIM model
In: *Measuring Vulnerability to Natural Hazards*. UN University Press, Tokyo, New York, Paris (ED: Joern Birkmann), 380-398 (2006)

Hochreiter, R.; **Pflug, G.**
Polynomial algorithms for pricing path dependent interest rate instruments
Computational Economics **28**, 3, 291-309 (2006)

Klein, I.
A comment on market free lunch and free lunch.
Mathematical Finance **16/3**, 583-588 (2006)

Klein, I.
Market free lunch and large financial markets.
The Annals of Applied Probability **16/4**, 2055-2077 (2006)

Leeb, H.; **Pötscher, B. M.**;
Performance Limits for Estimators of the Risk or Distribution of Shrinkage-Type Estimators, and Some General Lower Risk-Bound Results
Econometric Theory **22**, 69-97 (2006)

Leeb, H.; **Pötscher, B. M.**
Can One Estimate the Conditional Distribution of Post-Model-Selection Estimators?,
Annals of Statistics **34**, 2554-2591 (2006)

Meisel, D.V.; Byrne, R.A.; Kuba, M.; Mather, J.; Ploberger, W.; **Reschenhofer, E.**
Contrasting activity patterns of two related octopus species, Octopus macropus and Octopus vulgaris
Journal of Comparative Psychology **120**, 191-197 (2006)

Nickl, R.
Donsker type theorems for nonparametric maximum likelihood estimators
Probability Theory and Related Fields. in press (*published* online 10/2006)

Nickl, R.
Empirical and Gaussian processes on Besov classes
In: High Dimensional Probability (eds. E. Gine, V. Koltchinski, W. Li, J. Zinn)
IMS Lecture Notes and Monograph Series, **51**, 185-195 (2006)

Pflug, G.
On distortion functionals
Statistics and Decisions **24**, 45-60 (2006)

Pflug, G.
A value-of-information approach to measuring risk in multiperiod economic activity.
Journal of Banking and Finance **30** (2) 695-715 (2006)

Pötscher, B. M.
The Distribution of Model Averaging Estimators and an Impossibility Result Regarding Its Estimation, in: H.-C. Ho, C.-K. Ing and T.-L. Lai (eds.), Time Series and Related Topics: In Memory of Ching-Zong Wei.
IMS Lecture Notes and Monograph Series, **52**, 113-129.

Reschenhofer, E.
Selecting selection methods
InterStat July 2006

Reschenhofer, E.
Relationship between optimal penalties and decay rates
Far East Journal of Theoretical Statistics **20**, 1-12 (2006)

Papers finished in 2006

Baierl, A.; Biecek, P.; Bogdan, M.; **Futschik, A.**
Locating multiple interacting quantitative trait loci using robust model selection

Bomze, I.; **Frommlet, F.**; Locatelli, M.
The first cut is the cheapest: improving SDP bounds for the clique number via copositivity
TR 2006-04

Bomze, I.; Locatelli, M.; Tardella, F.
New and old bounds for standard quadratic optimization: dominance, equivalence and incomparability
TR 2006-09 (=TR 2005-10 revised)

Broussev, N.; **Pflug, G.**
Electricity Swing Options: Behavioral Models and Pricing

Futschik, A.; Gach, F.
On the inadmissibility of Watterson's estimate.

Futschik, A.; Gach, F.
Improved Versions of Some Common Estimators of the Scaled Mutation Rate.

Gine, E.; **Nickl, R.**
Uniform central limit theorems for kernel density estimators

Gutjahr, W. J.
First steps to the runtime complexity analysis of Ant Colony Optimization
Accepted for publication in "*Computers and Operations Research*".

Gutjahr, W. J.
A provably convergent heuristic for stochastic bicriteria integer programming.

Gutjahr, W. J.
Mathematical runtime analysis of ACO algorithms: survey on an emerging issue.

Hochreiter, R.; Paulsen, V.; **Pflug, G.**
Optimal management of unit linked life insurance
To appear in: *Handbook of asset and liability management* (B. Ziemba and S. Zenios eds.)

Kilianova, S.; **Pflug, G.**
Optimal management of Slovak pension funds

Leeb, H.; **Pötscher, B. M.**
Model Selection, in: Torben G. Andersen, Richard A. Davis, Jens-Peter Kreiss, Thomas Mikosch (eds.), *Handbook of Financial Time Series*, Springer-Verlag, forthcoming.

Nickl, R.
On convergence and convolutions of random signed measures

Nickl, R.
Uniform central limit theorems for density estimators

Pflug, G.; **Mirkov, R.**
Tree approximations of dynamic stochastic programs
(submitted to SIAM J. Optimiziation)

Pflug, G.; Wozabal, D.
Ambiguity in Portfolio Selection

Pflug, G.; **Wozabal, N.**
Consistency of risk measures
TR2006-11

Pflug, G.; **Wozabal, N.**
On the asymptotic distribution of version independent risk functionals
TR2006-12

Ploberger, W.; **Reschenhofer, E.**
Testing for cycles in time series

Posch, M.; **Futschik, A.**
A uniform improvement of Bonferroni type tests by sequential tests

Pötscher, B. M.
The Distribution of Model Averaging Estimators and an Impossibility Result Regarding Its Estimation, in: H.-C. Ho, C.-K. Ing and T.-L. Lai (eds.), Time Series and Related Topics: In Memory of Ching-Zong Wei.
IMS Lecture Notes and Monograph Series, Vol. 52, pp. 113-129.

Pötscher, B. M.
The ET-Interview: Professor Manfred Deistler, Econometric Theory, forthcoming.

Rauner, M.; **Gutjahr, W. J.** , Heidenberger, K.; Wagner, J.; Pasia, J.
Dynamic policy modeling for chronic diseases: metaheuristic-based identification of pareto-optimal screening strategies

Rubey, M.
Increasing and Decreasing Sequences in Fillings of Moon Polyominoes
arXiv:math.CO/0604140

Schachinger, W.; **Bomze, I.**
A conic duality Frank-Wolfe type theorem via exact penalization in quadratic optimization
TR 2006-10

Zak, M.; **Baierl, A.**; **Futschik, A.**; Bogdan, M.
Locating multiple interacting quantitative trait loci using rank-based model selection

Research stays at other institutions 2006

Person	Institution	Research topic	Duration in weeks
Bomze, Immanuel	DIS, Universita "La Sapienza", Rom, ITA	Standard quadratic optimization: theory, procedures, applications	1
Bomze, Immanuel	DEIS, Universita della Calabria, Rende (Cosenza), ITA	Standard quadratic optimization: theory, procedures, applications	1
Futschik, Andreas	TU Wroclaw, POL	Statistical Methods for QTL mapping	1
Futschik, Andreas	University of Limerick, IRL	Statistical Methods in Population Genetics	1
Gutjahr, Walter J.	National Research Council, Rome, ITA	Analysis of ACO algorithms	2
Nickl, Richard	Postdoctoral Fellow Department of Mathematics, University of Connecticut,USA		since 08/2006

Presentations at conferences 2006

Person	Conference	Title of presentation
Baierl, Andreas	R-user Conference, Vienna, AUT	Implementation of robust methods for locating quantitative trait loci in R
Baierl, Andreas	Applied Statistics 2006, Bled, SVN	Locating Multiple Interacting Quantitative Trait Loci by Model Selection Techniques
Bomze, Immanuel	EURO XXI, Reykjavik, ISL	Multi-Standard Quadratic Optimization Problems

Bomze, Immanuel	8th ERCIM Workshop on Matrix Computations and Statistics, Salerno, ITA	Multi-Standard Quadratic Optimization Problems and their role in support vector machine optimization
Bomze, Immanuel	Operations Research 2006, Karlsruhe, DEU	Multi-Standard Quadratic Optimization Problems
Frommlet, Florian	EURO XXI, Reykjavik, ISL	Improving SDP bounds for maximum clique by adding linear cuts
Frommlet, Florian	Österreichische Statistikertage, Oktober 2006, AUT	Extending the modified BIC to QTL mapping with densly spaced markers and to multiple interval mapping
Futschik, Andreas	NordStat 2006 Conference, Rebuild, DNK	On the Optimum Number of Hypotheses to Test when the Number of Observations is Limited
Gutjahr, Walter J.	Meeting of the GOR Working Group "Project Management and Scheduling", Vienna, June 2006, AUT	On the dynamics of competence development in R & D Project portfolio selection
Gutjahr, Walter J.	Matheuristics 2006 (1st Workshop on Mathematical Contributions to Metaheuristics), Bertinoro, ITA	A provably convergent heuristic for bicriteria stochastic integer programming
Mirkov, Radoslava	EURO XXI, Reykjavik, ISL	Quality of Tree Approximation for Multistage Stochastic Programming
Nickl, Richard	European Econometric Society Meeting, Vienna, AUT	Donsker-type theorems for nonparametric maximum likelihood estimators
Pflug, Georg	New Directions in Financial Modelling, London, GBR	Ambiguity in portfolio selection
Pflug, Georg	APMOD 06, Madrid, ESP	Stochastic games and minimax models: From ambiguity problems to the pricing of swing options
Pflug, Georg	Decision making in Finance, Roma, ITA	Ambiguity in portfolio selection
Pflug, Georg	EURO XXI, Reykjavik, ISL	Distortion functionals in stochastic optimization
Pflug, Georg	Financial Engineering and Risk Management ’06, Wien, AUT	The AURORA Risk Management System
Pflug, Georg	Prague Stochastics, CZE	Tree approximations for multiperiod stochastic programs
Pflug, Georg	Operations Research 2006, Karlsruhe, DEU	Measuring risk for one- and multiperiod activities

Pötscher, Benedikt	9th Vilnius Conference on Probability and Statistics, Vilnius, June/July 2006, LTU	Model Selection and Inference (*invited*)
Pötscher, Benedikt	Econometric Society European Meeting, Vienna, August 2006, AUT	Model Selection and Inference (*invited*)
Pötscher, Benedikt	NSF/NBER Time Series Conference, Montreal, September 2006, CAN	Sparse Estimators and the Oracle Property, or the Return of Hodges' Estimator (*invited*)
Pötscher, Benedikt	5th International Conference on Probability & Statistics, ProbaStat'06, Smolenice, June 2006, SVK	Sparse Estimators and the Oracle Property, or the Return of Hodges' Estimator
Wozabal, Nancy	EURO XXI, Reykjavik, ISL	Asymptotic properties of risk functionals

Talks given at other institutions 2006

Person	**Institutiton**	**Title**
Futschik, Andreas	OSG (Österr. Statist. Gesellschaft), Wien, AUT	Sequence Alignment aus statistischer Sicht
Futschik, Andreas	University of Limerick, IRL	Improvement of Watterson's and related estimates for the mutation rate based on shrinkage
Gutjahr, Walter J.	IRIDIA, Universite Libre de Bruxelles, BEL	Investigating the runtime of ACO: application views and analytical tools
Nickl, Richard	Inst. Mathematische Statistik, Universität Bern (06/2006), CHE	Uniform central limit theorems for density estimators
Nickl, Richard	Dept. Statistics, Yale University (09/2006), USA	Uniform central limit theorems for density estimators
Nickl, Richard	Dept. Mathematics, Univ. Connecticut (10/2006), USA	Some limit theorems for random measure processes
Nickl, Richard	Dept. Mathematics, Massachussets Institute of Technology (11/2006), USA	Rates of convergence in the CLT for empirical processes
Pflug, Georg	Humboldt Universität Berlin, DEU	On Distortion Risk Functionals
Pflug, Georg	University of California at Davis, USA	Ambiguity and Minimax problems

Pflug, Georg	Varna Free University, BGR	The AURORA financial management system
Pötscher, Benedikt	Department of Mathematics, University of Göttingen, November 2006, DEU	Model Selection and Inference
Pötscher, Benedikt	Department of Mathematics, University of Kaiserslautern, November 2006, DEU	Model Selection and Inference

Referee work for journals and organisations

Bomze, Immanuel	Central European Journal of Operations Research (1) Games and Economic Behaviour (1) IEEE Transactions on Signal Processing (1) Journal of Combinatorial Optimization (1) Mathematical Programming (1) Operations Research (1) Optimization Letters (1) SIAM Journal on Optimization (3)
Futschik, Andreas	Journal of Multivariate Analysis (2) Computational Statistics and Data Analysis (1) Journal of the Royal Statistical Society (1) Econometric Theory (1) Central European Journal of OR (1) Statistical Applications in Genetics and Molecular Biology (1) Reviewer for Mathematical Reviews (2)
Gutjahr, Walter J.	Computing (1) SIAM Journal of Optimization (1) Artificial Intelligence in Medicine (1) IEEE Transactions On Systems, Man, and Cybernetics (1) Computers and Operations Research (2) Kuwait Journal of Science and Engineering (1) Central European Journal of Operations Research (2) IEEE Transactions on Evolutionary Computation (1) Journal of Systems and Software (2) International Journal of Operations Research (1) Operations Research Letters (1) Journal of Heuristics (1)
Nickl, Richard	Journal of Multivariate Analysis Journal of Econometrics
Pötscher, Benedikt	Econometric Theory Econometric Reviews Journal of Econometrics IMS Lecture Notes and Monograph Series
Schneider, Ulrike	Water Resources Management (1)

Editorial work

Bomze, Immanuel	Central European Journal of Operations Research Journal of Global Optimization Optimization Letters TOP
Futschik, Andreas	Journal of Information and Management Sciences (Assoc. Editor)
Gutjahr, Walter J.	Special Issue of “Computers and Operations Research” on “Search-Based Software Engineering” with Harman, Mark
Mirkov, Radoslava	Special Issues - Annals of OR, Quantitative Finance, Journal of Banking and Finance, CEJOR, with Prof. G. Ch. Pflug
Pflug, Georg	is associate editor of the following journals: Statistics and Probability Letters Mathematical Methods of OR Computational Optimization and Applications Computational Management Science Central European Journal of OR Austrian Journal of Statistics
Pötscher, Benedikt	Co-editor of Econometric Theory Associate Editor of Journal of Econometrics Guest-Editor of Special Issue of Econometric Theory

Membership as scientific professional in scientific organisations

Baierl, Andreas	Öst. Statistische Gesellschaft OSG
Bomze, Immanuel	Italienische Gesellschaft für OR (AIRO) OSG Öst. Mathem.Gesellschaft (ÖMG) Öst. Gesellschaft f. OR (ÖGOR)
Futschik, Andreas	OSG IMS
Gutjahr, Walter J.	ÖGOR (executive board member)
Mirkov, Radoslava	SIAM (Optimization)
Nickl, Richard	Institute of Mathematical Statistcs
Pflug, Georg	OSG ÖMG ÖGOR
Pötscher, Benedikt	AMS ASA IMS Econometric Society Verein für Socialpolitik (Ausschuss für Ökonometrie) OSG
Schachinger, Werner	ÖMG
Schneider, Ulrike	ASA

Public Relations Activities

Bomze, Immanuel
SchülerInnen Tag 2006

Eder, Anselm; Gutjahr, Walter J.; Uchida, Gabriele
Event at "KinderuniWien"

Futschik, Andreas
Schüleraktion 2006
Mitwirkung an Uni-Orientiert
Studieninformationsmesse

Gutjahr, Walter J.
Scientific interview for the online journal dieUniversität, Mai 2006 (Title: "Talent Management – Kompetenzen geplant weiterentwickeln")

Gutjahr, Walter J.; Uchida, Gabriele
Scientific interview for the journal hi!tex, July 2006 (Title: "Mathematik entscheidet – Interaktiv verfahren")

Supervision of Diploma Theses and Ph.D. Theses

DA ....Diplomarbeit
DISS 1 ...Dissertation – First referee
DISS 2 ...Dissertation – Second referee

Supervisor	**Author**	**DA/DISS 1/DISS 2**
Bomze, Immanuel	Wassermann, Bertram	DISS 1
Futschik, Andreas	König, Franz	DISS 2
Futschik, Andreas	Zehetmayer, Sonja	DISS 2
Futschik, Andreas	Hochrainer, Stefan	DISS 2
Gutjahr, Walter J.	Nolz, Pamela	DA
Gutjahr, Walter J.	Pasia, Joseph	DISS 2
Gutjahr, Walter J.	Vuong, Monika	DA
Schachinger, Werner	Kuba, Markus	DISS 2

Other professional activities

Bomze, Immanuel	Member of executive board of OSG (until April 2006) President of ÖGOR Head of Department (until Sept.2006) Vice Dean of Faculty of Business, Economics and Statistics (since October 2006)

	Member of Program Committee for: EUROPT Workshop "Advances in Continuous Optimization", Reykjavik 2006 Operations Research 2006, Karlsruhe 2006
Futschik, Andreas	Vorstandsmitglied OSG
Gutjahr, Walter J.	Project coordinator of the funded project “Competence-Driven Project Portfolio Analysis” (FWF, grant L264-N13) Program Committee IEEE SIS 2006 Program Committe GECCO 2006 Program Committee ANTS 2006 Program Committe Random Testing 2006 Program Committe MOTES 2006 Program Committe FOGA 2006 Program Committee IEEE SIS 2007 Program Committee EvoCop 2007
Pflug, Georg	Organization of the workshop “Financial Engineering and Risk Management ’06 ”, at the University of Vienna (September 25)
Pötscher, Benedikt	Member of Program Committee: Econometrics and Empirical Economics, Econometric Society, European Meeting 2006 Organizer of an Invited Session “Time Series Analysis” at PROBASTAT 2006
Rubey, Martin	Organization of Axiom Workshop 2006 at RISC, with Ralf Hemmecke
Schachinger, Werner	Head of Department (since October 2006)

Talks given at the department in 2006

09. Jänner: N. Wozabal, Wien
Asymptotic analysis of risk measures

16. Jänner: K. Gröchenig, Wien
Random sampling of trigonometric polynomials

06. März: R. Sagarna, San Sebastian
Estimation of Distribution Algorithms in Software Testing

20. März: U. Schneider, Wien
Advances and Applications in Perfect Sampling

27. März: M. Bogdan, Wroclaw
Locating quantitative trait loci with a modified version of BIC

03. April: C. Starica, Chalmers
When did the 2001 recession *really* end ?

24. April: B. Laurent, Toulouse
Adaptive goodness-of-fit-tests in a density model

08. Mai: M. Bloznelis, Vilnius
Normal approximation of statistics based on samples drawn without replacement

15. Mai:F. Jarre, Düsseldorf
A new augmented primal-dual method for linear conic minimization

22. Mai: A. v. Haeseler, Wien
Towards realistic models of sequence evolution

29. Mai: M. Gaudioso, Cosenza
Algorithms for convex nonsmooth minimization and their extension to the nonconvex case
12. Juni: G. Sebastiani, Rom
Functional minimization for quantifying human brain connectivity from DT-MRI

19. Juni: P. Tseng, Washington
SOCP Relaxation of Sensor Network Localization

09. Oktober: P. Mutzel, Dortmund
Exact crossing minimization

16. Oktober: H. Albrecher, Graz
Ruin theory for an insurance portfolio with dependent risks

23. Oktober: H. Weisshaupt, Wien
Das Randomisierungskriterium von LeCam: Neue Aspekte zur mathematischen Struktur

30. Oktober: S. v. d. Geer, Zürich
Empirical risk minimization: probabilistic techniques and theoretical results

06. November: I. Klein, Wien
Notions of no arbitrage and large financial markets

27. November: G. Kauermann, Bielefeld
Pönalisierte Spline Regression und Gemischte Modelle - eine erfolgversprechende Allianz

29. November: H. Dette, Bochum
Monotone nichtparametrische Regression

04. Dezember: M. Posch, Wien
Single and two-stage designs for tests of a large number of hypotheses

11. Dezember: S. Frühwirth-Schnatter, Linz
Capturing unobserved heterogeneity in dynamic transition models

11. Dezember: M. Dür, Darmstadt
Towards solving copositive programs

11. Dezember: K. Anstreicher, Iowa
An improved algorithm for computing Steiner minimal trees in Euclidean d-space

12. Dezember: A. Sartenaer, Namur
Recursive trust-region methods for multiscale nonlinear optimization

12. Dezember: I. Bomze, Wien
The first cut is the cheapest - improving SDP bounds for the clique number

12. Dezember: D. Hochbaum, Berkeley
Ranking sports teams, web pages, academic papers, and NSF proposals with optimization techniques

12. Dezember: A. van der Linde, Bremen
Zur Komplexität statistischer Modelle

13. Dezember: H. Leeb, Yale
Evaluation and selection of models for out-of-sample prediction when the sample size is small relative to the complexity of the data-generating process