

Stefan Vigerske

Curriculum Vitae

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Business Address

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Home Address

Friedenstraße 3
12489 Berlin
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Academic Degrees

2005 Diploma in Mathematics, Humboldt-University Berlin

2005 Diploma in Computer Science, Humboldt-University Berlin

Awards

2006 Award from the Institute for Computer Science at Humboldt-University for the Diploma Thesis “Asymptotic enumeration of unlabelled outerplanar graphs”

Professional Experience

2001-2004 Student Assistant, Humboldt-University Berlin

2005- Research Associate, Humboldt-University Berlin

Research Experience and Interests

Applied Mathematics; Operations Research; Stochastic Optimization; Global Optimization; Mixed-Integer Nonlinear Programming; Combinatorics

Research Projects

2001-2004 Optimizing the design of a complex energy conversion plant supported by the German Science Foundation (DFG)

2005-2008 Decentralised Regenerative Energy Supply: Innovative Modelling and Optimization supported by the Federal Ministry of Education and Research (BMBF)

2007 Simulation based stochastic Optimisation Methods for Risk Management in Liberalized Energy Markets supported by the Vienna Science and Technology Fund (WWTF)

2008-2009 Nonconvex Mixed Integer Nonlinear Programming (MATHEON B19) supported by the German Science Foundation (DFG)

2009- Optimization of Gas Transport (MATHEON B20) supported by the German Science Foundation (DFG)

Services to the Scientific Community

Refereed Papers: 13^{1/2}

2004-2010 organizer of the friday afternoons cake-and-tea break for the Numerical Analysis group

2006- project manager of COIN-OR project LaGO (development of a global optimization solver)

2007- project manager of COIN-OR project GAMSlinks (development of interfaces from GAMS to open source solvers)

2007 co-organizer of a COIN-OR session at Operations Research 2007 (Saarbrücken)

2007- contributor to COIN-OR project TestTools (development of scripts for nightly builds, tests, and binary distribution of COIN-OR projects)

2007- full member of the COIN-OR Foundation

2008 organizer of an open-source software session at INFORMS Annual Meeting 2008 (Washington, D.C.)

2009- member of COIN-OR Technical Leadership Council

2009- managing editor of MINLPLib and GlobalLib

Talks at International Conferences

2006 LaGO - a Branch and Cut framework for nonconvex MINLPs
invited talk at Euro XXI conference, Reykjavik

2006 LaGO - Branch and Cut for nonconvex block-separable MINLPs in the absence of algebraic formulations
invited talk at GICOLAG workshop, Vienna

2007 Recombination of Scenarios in Multistage Stochastic Programming
Spring School Stochastic Programming: Theory and Applications, Bergamo

2007 LaGO - Branch and Cut for nonconvex MINLPs
Advances in Global Optimization: Methods and Applications, Myconos

2007 LaGO - Branch and Cut for nonconvex MINLPs
invited talk at Euro XXII conference, Prague

2007 COIN-OR / GAMS links - Hooking your solver to GAMS
invited talk at Euro XXII conference, Prague

2007 Performance of COIN-OR solvers for the solution of MINLPs using GAMS
invited talk at Euro XXII conference, Prague

2007 Decomposition of Multistage Stochastic Programs with Recombining Scenario Trees
11th Conference on Stochastic Programming, Vienna

2007 Interfacing COIN-OR solvers by GAMS
Operations Research 2007, Saarbrücken

2007 Decomposition of Multistage Stochastic Programs with Recombining Scenario Trees
Operations Research 2007, Saarbrücken

2007 LaGO - Branch and Cut for nonconvex MINLPs
invited talk at 13th Czech-French-German Conference on Optimization, Heidelberg

- 2007** LaGO - Branch and Cut for nonconvex MINLPs
invited talk at 79th meeting of the GOR working group “Praxis der mathematischen Optimierung”, Bad Honnef, Germany
- 2008** Decomposition of Multistage Stochastic Programs with Recombining Scenario Trees
SIGOPT 2008 - International Conference on Optimization, Lambrecht
- 2008** Decomposition of Multistage Stochastic Programs with Recombining Scenario Trees
CARIPLO Workshop on Numerical Linear and Nonlinear Stochastic Programming,
University of Edinburgh, Scotland
- 2008** Hooking your solver to GAMS - The COIN-OR/GAMSlinks project
INFORMS Annual Meeting, Washington D.C.
- 2008** Solving Nonconvex MINLPs with LaGO
invited talk at INFORMS Annual Meeting, Washington D.C.
- 2008** Solving nonconvex MINLP by quadratic approximation
invited talk at IMA Hot Topics Workshop: Mixed-Integer Nonlinear Optimization:
Algorithmic Advances and Applications, Minneapolis
- 2008** Decomposition of Multistage Stochastic Programs with Recombining Scenario Trees
COPI'08 - Conference on Optimization and Practices in Industry, EDF Recherche &
Développement, Clamart
- 2009** Extending SCIP for solving mixed-integer nonlinear programs
invited talk at CIMINP - Spring Workshop on Computational Issues in Mixed Integer
Nonlinear Programming, Bordeaux
- 2009** Extending SCIP for MINLP
MOPTA 2009 - Modelling and Optimization: Theory and Applications, Bethlehem
(PA), USA
- 2009** Extending a CIP framework for solving mixed-integer nonlinear programs
invited talk at 20th International Symposium on Mathematical Programming, Chi-
cago
- 2010** Numerical Evaluation of Approximation Methods in Stochastic Programming
12th International Conference on Stochastic Programming, Halifax, Canada
- 2010** Extending SCIP towards MINLP
invited talk at Discrete Optimization 2010, UNSW, Sydney

Publications

- [1] I. Nowak, H. Alperin, and S. Vigerske. LAGO - an object oriented library for solving MINLPs. In Ch. Bliet, Ch. Jermann, and A. Neumaier, editors, *Global Optimization and Constraint Satisfaction*, volume 2861 of *Lecture Notes in Computer Science*, pages 31–43. Springer, 2003. First International Workshop on Global Constraint Optimization and Constraint Satisfaction, COCOS 2002.
- [2] S. Vigerske. Random outerplanar graphs. seminar paper, 2005.
- [3] S. Vigerske. Adaptive Diskretisierung stochastischer Optimierungsprobleme. Master’s thesis, Humboldt-Universität zu Berlin, 2005.
- [4] S. Vigerske. Asymptotic enumeration of unlabelled outerplanar graphs. Master’s thesis, Humboldt-University Berlin, 2005.
- [5] W. Römisch and S. Vigerske. Quantitative stability of fully random mixed-integer two-stage stochastic programs. *Optimization Letters*, 2:377–388, 2008.
- [6] I. Nowak and S. Vigerske. Adaptive discretization of convex multistage stochastic programs. *Mathematical Methods of Operations Research*, 65:2, 2007.
- [7] C. Küchler and S. Vigerske. Decomposition of multistage stochastic programs with recombining scenario trees. *Stochastic Programming E-Print Series*, 9, 2007. <http://www.speps.org>.
- [8] T. Ahadi-Oskui, S. Vigerske, I. Nowak, and G. Tsatsaronis. Optimizing the design of complex energy conversion systems by branch and cut. *Computers & Chemical Engineering*, 34(8):1226–1236, 2010.
- [9] M. Bodirsky, É. Fusy, M. Kang, and S. Vigerske. Enumeration and asymptotic properties of unlabeled outerplanar graphs. *Electronic Journal of Combinatorics*, 14(1):R66, September 2007. available at http://www.combinatorics.org/Volume_14/Abstracts/v14i1r66.html.
- [10] M. Jüdes, G. Tsatsaronis, and S. Vigerske. Entwurfsoptimierung von Energieumwandlungsanlagen mit mehreren Betriebspunkten. In *Optimierung in der Energiewirtschaft*, number 2018 in VDI-Berichte, pages 199–210. VDI-Verlag, Düsseldorf, 2007.
- [11] A. Epe, C. Küchler, W. Römisch, S. Vigerske, H.-J. Wagner, C. Weber, and O. Woll. Stochastische Optimierung mit rekombinierenden Szenariobäumen – Analyse dezentraler Energieversorgung mit Windenergie und Speichern. In *Optimierung in der Energiewirtschaft*, number 2018 in VDI-Berichte, pages 3–13. VDI-Verlag, Düsseldorf, 2007.

- [12] C. Küchler and S. Vigerske. Numerical evaluation of approximation methods in stochastic programming. *Optimization*, 59(3):401–415, 2010. Proceedings of the 11th Conference on Stochastic Programming, SPXI 2007, Vienna.
- [13] A. Epe, C. Küchler, W. Römisch, S. Vigerske, H.-J. Wagner, C. Weber, and O. Woll. Optimization of dispersed energy supply – stochastic programming with recombining scenario trees. In J. Kallrath and P. Pardalos, editors, *Optimization in the Energy Industry*, chapter 15, pages 347–364. Springer, 2009.
- [14] M. Jüdes, G. Tsatsaronis, and S. Vigerske. Optimization of the design and partial-load operation of power plants using mixed-integer nonlinear programming. In J. Kallrath, P. Pardalos, S. Rebennack, and M. Scheidt, editors, *Optimization in the Energy Industry*, chapter 9, pages 193–220. Springer, 2009.
- [15] C. Küchler and S. Vigerske. Ein Dekompositionsverfahren für stochastische Optimierungsprobleme mit rekombinierenden Szenariobäumen. In R. Schultz and H.-J. Wagner, editors, *Innovative Modellierung und Optimierung von Energiesystemen*, volume 26 of *Umwelt- und Ressourcenökonomik*, chapter 10, pages 201–226. LIT Verlag, 2009.
- [16] A. Epe, C. Küchler, W. Römisch, S. Vigerske, H.-J. Wagner, C. Weber, and O. Woll. Ökonomische Bewertung von elektrischen Energiespeichern - Ausbau und Betrieb im Kontext wachsender Windenergieerzeugung. In R. Schultz and H.-J. Wagner, editors, *Innovative Modellierung und Optimierung von Energiesystemen*, volume 26 of *Umwelt- und Ressourcenökonomik*, chapter 7, pages 135–152. LIT Verlag, 2009.
- [17] I. Nowak and S. Vigerske. LaGO: a (heuristic) branch and cut algorithm for nonconvex MINLPs. *Central European Journal of Operations Research*, 16(2):127–138, 2008.
- [18] W. Römisch and S. Vigerske. Recent progress in two-stage mixed-integer stochastic programming with applications in power production planning. In S. Rebennack, P.M. Pardalos, M.V.F. Pereira, and N.A. Iliadis, editors, *Handbook of Power Systems I*, pages 177–208. Springer, 2010.
- [19] T. Berthold, S. Heinz, and S. Vigerske. Extending a CIP framework to solve MIQCPs. In Jon Lee and Sven Leyffer, editors, *Mixed-integer nonlinear optimization: Algorithmic advances and applications*, volume 154 of *IMA volumes in Mathematics and its Applications*, pages 427–444. Springer, 2012.
- [20] A. Bley, A.M. Gleixner, T. Koch, and S. Vigerske. Comparing MIQCP solvers to a specialised algorithm for mine production scheduling. ZIB-Report 09-32, Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB), October 2009. <http://opus.kobv.de/zib/volltexte/2009/1206/>.
- [21] W. Neun, T. Sturm, and S. Vigerske. Supporting global numerical optimization of rational functions by generic symbolic convexity tests. In V.P. Gerdt, W. Koepf,

- E.W. Mayr, and E.H. Vorozhtsov, editors, *Computer Algebra in Scientific Computing*, volume 6244 of *Lecture Notes in Computer Science*. Springer, 2010. Proceedings of 12th International Workshop on Computer Algebra in Scientific Computing, CASC 2010, Tsakhadzor, Armenia.
- [22] M.R. Bussieck and S. Vigerske. MINLP solver software. In *Wiley Encyclopedia of Operations Research and Management Science*. Wiley, 2010. <http://www.math.hu-berlin.de/~stefan/minlpsoft.pdf>.
- [23] M. Bodirsky, É. Fusy, M. Kang, and S. Vigerske. Boltzmann samplers, Pólya theory, and cycle pointing. *SIAM Journal on Computing*, 40(3):721–769, 2011.
- [24] T. Berthold, S. Heinz, A. Gleixner, and S. Vigerske. Extending SCIP for solving MIQCPs. In P. Bonami, L. Liberti, A.J. Miller, and A. Sartenaer, editors, *Proceedings of the European Workshop on Mixed Integer Nonlinear Programming*, pages 181–196, 2010. available at <http://www.lix.polytechnique.fr/~liberti/ewminlp/ewminlp-proceedings.pdf>.
- [25] T. Berthold, S. Heinz, A. Gleixner, and S. Vigerske. On the computational impact of MIQCP solver components. ZIB-Report 11-01, Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB), 2010. <http://vs24.kobv.de/opus4-zib/frontdoor/index/index/docId/1199>.
- [26] T. Berthold, S. Heinz, M. E. Pfetsch, and S. Vigerske. Large neighborhood search beyond MIP. In Luca Di Gaspero, Andrea Schaerf, and Thomas Stützle, editors, *Proceedings of the 9th Metaheuristics International Conference (MIC 2011)*, pages 51–60, 2011.
- [27] S. Vigerske. *Decomposition of Multistage Stochastic Programs and a Constraint Integer Programming Approach to Mixed-Integer Nonlinear Programming*. PhD thesis, Humboldt Universität zu Berlin, 2012. Submitted.