

Dr. Elisabeth Köbis
Martin Luther University Halle-Wittenberg
Institute for mathematics

Research Interests

- Robust Optimization
- Robust Approaches for Uncertain Multi-Objective Optimization Problems
- Set Optimization
- Unified Approaches to Uncertain Optimization Using Nonlinear Scalarization

Scientific Reviewing

- Abstract and Applied Analysis
- Applicable Analysis
- Boundary Value Problems
- European Journal of Operational Research
- Journal of Inequalities and Applications
- Journal of Optimization Theory and Applications
- Mathematical Methods of Operations Research
- Operations Research Letters
- Optimization

Publications

- E. Köbis, M.A. Köbis and J.-C. Yao: Generalized Upper Set Less Order Relation by Means of a Nonlinear Scalarization Functional. *Journal of Nonlinear and Convex Analysis*. Special Issue: International Workshop on Nonlinear and Variational Analysis 2015 in Kaohsiung, Taiwan. To appear 2016.
- E. Köbis: Set Optimization by Means of Variable Order Relations. *Optimization*, 2016, DOI: 0.1080/02331934.2016.1172226.
- E. Köbis and Chr. Tammer: Characterization of Set Relations by Means of a Nonlinear Scalarization Functional. In Hoai An Le Thi, Tao Pham Dinh and NgocThanh Nguyen, editors, *Modelling, Computation and Optimization in Information Systems and Management Sciences*, Volume 359 of *Advances in Intelligent Systems and Computing*, pages 491-503, Springer International Publishing, 2015.
- A.A. Khan, E. Köbis and Chr. Tammer: Scalarization Methods in Multicriteria Optimization, Robustness, Risk Theory and Finance. In: M. Al-Shammari and H. Masri (Eds.): *Multiple Criteria Decision Making in Finance, Insurance and Investment*, Springer, 2015.
- E. Köbis: On Robust Optimization: Relations Between Scalar Robust Optimization and Unconstrained Multicriteria Optimization. *Journal of Optimization Theory and Applications* 167 (3), 969–984, 2015.

- J. Ide and E. Köbis: Concepts of Efficiency for Uncertain Multi-Objective Optimization Problems Based on Set Order Relations. *Mathematical Methods of Operations Research* 80 (1), 99–127, 2014.
- J. Ide, E. Köbis, D. Kuroiwa, A. Schöbel and Chr. Tammer: The Relationship Between Multi-Objective Robustness Concepts and Set-Valued Optimization. *Fixed Point Theory and Applications* 83, DOI 10.1186/1687-1812-2014-83, 2013.
- K. Klamroth, E. Köbis, A. Schöbel and Chr. Tammer: A Unified Approach for Different Concepts of Robustness and Stochastic Programming via Nonlinear Scalarizing Functionals. *Optimization* 62(5), 649-671, 2013.
- E. Köbis and Chr. Tammer: Relations between Strictly Robust Optimization Problems and a Nonlinear Scalarization Method. *AIP Conference Proceedings* 1479:2371-2374, 2012.

Presentations

- Set order relations by means of a nonlinear scalarizing functional. Kolloquium "Set-Valued Optimization", Martin-Luther-University Halle-Wittenberg, Germany, 29.02.2016.
- Treatment of set order relations by means of a nonlinear scalarization functional: A full characterization. Workshop „Vektor- und Mengenoptimierung“, Wittenberg, Germany, 01.-02.10.2015.
- A Variable Ordering Structure in Set-valued Optimization. 2015 International Workshop on Nonlinear and Variational Analysis, Kaohsiung Medical University, Research Center for Nonlinear Analysis and Optimization, Taiwan, 07.-09.08.2015 (Invited Speaker).
- Characterization of Set Relations by Means of a Nonlinear Scalarization Functional. Modelling, Computation and Optimization in Information Systems and Management Sciences (MCO 2015), Metz, France, 11.-13.05.2015.
- Variable Ordering Structures in Set Optimization. Workshop „Optimierung“, Ehrenfriedersdorf, Germany, 26.-27.02.2015.
- Variable Ordering Structures in Set Optimization. Workshop „Vektor- und Mengenoptimierung“, Wittenberg, Germany, 01.-02.10.2014.
- The Relationship Between Multicriteria Robustness Concepts and Set-Valued Optimization. 20th Conference of the International Federation of Operational Research Societies, Barcelona, Spain, 13.-18.07.2014.
- Robust Approaches to Multi-Objective Uncertain Optimization Using a Variable Ordering Structure. 12th EUROPT Workshop on Advances in Continuous Optimization, Perpignan, France, 10.-12.07.2014.
- A Robust Approach to Uncertainty in Optimization as an Application of Inverse Problems. 7th International Conference "Inverse Problems: Modeling and Simulation", Ölüdeniz, Fethiye, Turkey, 26.-31.05.2014.
- Robustness for Uncertain Optimization Problems Based on Set-Valued Optimization. Workshop „Vektor- und Mengenoptimierung“, Wittenberg, Germany, 27.09.2013

- Robust Vector Optimization: Robust Solutions to Uncertain Vector Optimization Problems and Relations to Set Optimization. Rochester Institute of Technology, USA, 21.08.2013
- A Unified Approach for Different Concepts of Robustness Via Nonlinear Scalarizing Functionals, Halle, Germany, 25.03.2013
- Relations between Strictly Robust Optimization Problems and a Nonlinear Scalarization Method. International Conference of Numerical Analysis and Applied Mathematics, Kos, Greece, 19.-25.09.2012
- A Unified Approach for Different Concepts of Robustness via Nonlinear Scalarizing Functionals. Workshop „Vektor- und Mengenoptimierung“, Wittenberg, Germany, 13.-14.09.2012
- A Unified Approach to Robustness Using a Nonlinear Scalarizing Functional. Rochester Institute of Technology, USA, 16.08.2012
- Robust Multicriteria Optimization Problems. European Conference on Operational Research, Vilnius, Lithuania, 08.-11.07.2012
- Multi-Facility Problems with a Line Barrier. Workshop „Vektor- und Mengenoptimierung“, Wittenberg, Germany, 13.09.2011
- Optimierung gestörter Probleme und Ekeland'sches Variationsprinzip. Workshop „Deterministische und Stochastische Variationsmethoden und Anwendungen“, Martin-Luther-University Halle-Wittenberg, Germany, November 2010

Visiting Positions

- 08/04/2015 - 08/19/2015: Kaohsiung Medical University, Research Center for Nonlinear Analysis and Optimization, Taiwan.
- 03/19/2015 - 04/10/2015: Kaohsiung Medical University, Research Center for Nonlinear Analysis and Optimization, Taiwan.
- 06/01/2013 - 08/28/2013: Rochester Institute of Technology, Rochester, NY, USA.
- 08/01/2012 - 08/31/2012: Rochester Institute of Technology, Rochester, NY, USA.
- 02/01/2012 - 02/28/2012: University of Wuppertal, Germany.

Teaching

- Summer 2016: Exercise to the lecture "Linear Optimization" (Lineare Optimierung, Prof. Tammer); Exercise to the lecture "Nonlinear Optimization" (Nichtlineare Optimierung, Prof. Tammer)
- Winter 2015/2016: Exercise to the lecture "Mathematics for Engineers" (Mathematik für Ingenieure B3, Prof. Gugat)
- Summer 2015: Exercise to the lecture "Engineering Mathematics" (Prof. Leugering)
- Winter 2014/2015: Exercise and tutorial to the lecture "Linear and Convex Optimization" (Lineare und konvexe Optimierung, Prof. Jahn)
- Summer 2014: Exercise to the lecture "Mathematics for Engineers" (Mathematik für Ingenieure E2, Prof. Achtziger)

Curriculum Vitae

- Since April 2016: Research Assistant at Martin-Luther-University Halle-Wittenberg
- January 2014 – March 2016: Research Assistant at Friedrich-Alexander-University Erlangen-Nuremberg
- January 23, 2015: Recipient of the "Luther Certificate" by the Martin-Luther-University Halle-Wittenberg
- June 19, 2014: Dissertation defense "On Robust Optimization: A Unified Approach to Robustness Using a Nonlinear Scalarizing Functional and Relations to Set Optimization"
- 2011-2014: Doctoral Studies of Mathematics, Martin-Luther-University Halle-Wittenberg
- 2009-2011: Graduate Studies Business Mathematics, Martin-Luther-University Halle-Wittenberg, M.Sc.; Master Thesis: "N-Standortprobleme mit linearer Barriere", Advisor: Prof. Dr. Christiane Tammer
- 2006-2009: Undergraduate Studies Business Mathematics, Martin-Luther-University Halle-Wittenberg, B.Sc.; Bachelor Thesis: "Portfolio-Optimierung nach Harry M. Markowitz - Eine Implementierung in Matlab", Advisor: Prof. Dr. Christiane Tammer