

Professor Michal Kočvara

Professor in Mathematical Optimization
Head of Optimization and Statistics

[School of Mathematics \(/schools/mathematics/index.aspx\)](/schools/mathematics/index.aspx)

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About

Michal's research interests include nonlinear and semidefinite optimization, optimization of elastic structures, and optimization with equilibrium constraints. Before joining the academic sphere, he worked for several years in the industry. He is particularly skilled to create a bridge between academic research and practical needs of the industry.

Before joining the University of Birmingham in January 2007, he was with the Academy of Sciences of the Czech Republic and, simultaneously, working on research projects at the Universities in Bayreuth and Erlangen, Germany.

His recent work has been supported by a 2M Euro EU FP6 project on structural optimization that had 5 academic and 5 industrial partners. He is a Co-Principal Investigator of the current EPSRC funded Bridging-the-Gap project Multidisciplinary optimization and data mining in Birmingham, (2008–2011, GBP430,000).

Michal is a (co-)author of a monograph and 40 journal articles on various aspects of mathematical optimization and optimization of mechanical structures. He developed or co-developed several computer programs for nonlinear optimization and optimization of elastic structures, some of them routinely used in academia and industry. He was a long-term visitor at the Institute of Mathematics and its Applications, University of Minnesota (2003), the Technical University of Denmark (2007) and the Institute for Pure and Applied Mathematics, UCLA (2010).

For more information, visit Michal's school web page at web.mat.bham.ac.uk/kocvara/ (<http://web.mat.bham.ac.uk/kocvara/>)

Qualifications

- DrSc in Numerical Analysis, Charles University, Prague 2001
- PhD in Numerical Analysis, Academy of Sciences, Prague, 1991
- MSc in Applied Mathematics, Charles University, Prague, 1981

Biography

Michal had held positions at two industrial research institutes before he joined the Czechoslovak Academy of Sciences. He held long term research positions at the Universities of Bayreuth and Erlangen, Germany.

Before coming to the University of Birmingham, he was a senior researcher at the Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic.

Teaching

- Topics in Management Mathematics/Conic Optimization
- Heuristic Optimization
- Nonlinear Programming I

Postgraduate supervision

Current students:

- Jan Fiala
- Angela Montenegro
- James Turner

Former students:

- B. Trukenbrod
- R. Werner
- R. Sommer
- M. Stingl

Research

- nonlinear and semidefinite optimization
- optimization of elastic structures
- optimization with equilibrium constraints

Other activities

Associate Editor of:

- SIAM J. Optimization
- Optimization Methods and Software
- Mathematical Programming Computation

Publications

Selected: (complete list located at web.mat.bham.ac.uk/kocvara/ (<http://web.mat.bham.ac.uk/kocvara/>))

J. Outrata, M. Kočvara and J. Zowe. Nonsmooth Approach to Optimization Problems with Equilibrium Constraints: Theory, Applications and Numerical Results. Kluwer Academic Publishers, Dordrecht, 1998.

J. Haslinger, M. Kočvara, G. Leugering, and M. Stingl. Multidisciplinary Free Material Optimization. SIAM J. Appl. Math. 70(7):2709-2728, 2010.

M. Stingl, M. Kočvara and G. Leugering. A Sequential Convex Semidefinite Programming Algorithm for Multiple-Load Free Material Optimization. SIAM J. Optimization, 20(1):130-155, 2009.

W. Aichtziger and M. Kočvara. Structural Topology Optimization with Eigenvalues. SIAM J. Optimization 18(4): 1129-1164, 2007.

M. Kočvara and M. Stingl. On the solution of large-scale SDP problems by the modified barrier method using iterative solvers. Mathematical Programming, Series B, 109(2-3):413-444, 2007.

M. Kočvara and J. Outrata. Optimization Problems with Equilibrium Constraints and their Numerical Solution. Mathematical Programming B 101(1):119-150, 2004.

P. Beremlijski, J. Haslinger, M. Kočvara, and J. Outrata. Shape Optimization in Contact Problems with Coulomb Friction. SIAM J. Optimization 13(2):561-587, 2002.

M. Kočvara. On the modelling and solving of the truss design problem with global stability constraints. structural and Multidisciplinary Optimization 23(3):189-203, 2002.

M. Kočvara, J. Zowe, and A. Nemirovski. Cascading - An Approach to Robust Material Optimization. Computers & Structures 76: 431-442, 2000. 76: 431-442, 2000.

A. Ben-Tal, M. Kočvara, A. Nemirovski and J. Zowe. Free material optimization via semidefinite programming: the multiload case with contact conditions. SIAM J. Optimization 9(4): 813-832, 1999 and SIAM Review, 42(4): 695-715, 2000.

J. Zowe, M. Kočvara and M. Bendsoe. Free material optimization via mathematical programming. Mathematical Programming, Series B, 79:445-466, 1997., 79:445-466, 1997.

M. Kočvara. An algebraic study of a local multigrid method for variational problems. Applied Mathematics and Computation, 51:17-41, 1992.

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