

CURRICULUM VITAE

MILAN HLADÍK



CONTACT

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EDUCATION AND ACADEMIC DEGREES

- 2015 Doc. at Charles University, habilitation thesis: Interval linear algebra
- 2003 – 2006 PhD study at Charles University, Faculty of Mathematics and Physics,
branch of study: Econometrics and operations research,
PhD thesis: Explicit description of supporting and separating hyperplanes
of convex polyhedral sets depending on parameters,
(supervisor: Libuše Grygarová).
- 1997 – 2003 Master study at Charles University, Faculty of Mathematics and Physics,
study program: Computer science,
specialization: Discrete mathematics and optimization,
thesis: Postoptimal analysis for transportation problem.

TEACHING EXPERIENCES

at Faculty of Mathematics and Physics, Charles University (2003–?):

- basic course in Linear algebra I, II and III, advanced lectures in Integer programming, Multicriteria optimization, Fundamentals of nonlinear optimization, Nonlinear optimization algorithms, Discrete and Continuous Optimization.
- introducing and teaching Interval methods
- introducing and leading Optimization seminar

- teaching assistant of Discrete mathematics, Graph theory and combinatorics I, Algorithms and data structures II (besides the aforementioned).

WORKING EXPERIENCES

- 2015 – ? Associate professor at Charles University, Faculty of Mathematics and Physics, Department of Applied Mathematics
- 2012 – ? External researcher at University of Economics, Faculty of Informatics and Statistics, Department of Econometrics
- 2009 – 2015 Assistant professor at Charles University, Faculty of Mathematics and Physics, Department of Applied Mathematics
- 2008 (17 December 2007 – 31 August 2008) Postdoc position in COPRIN team at INRIA, Sophia Antipolis, France. Research subject: Interval linear algebra.
- 2006 – 2009 Junior researcher at Charles University, Faculty of Mathematics and Physics, Department of Applied Mathematics

ACADEMIC EXPERIENCES

- 2015 – ? head of Optimization Division at the Department of Applied Mathematics
- 2012 – 2015 scientific secretary at the Department of Applied Mathematics

MISCELLANEA

- 2016 in June 23, author of a new logo of the Department of Applied Mathematics

GUESTS

- 2015 *Marzieh Dehghani-Madiseh*, Amirkabir Univ. of Technology, Tehran, Iran
topic: New methods in interval matrix computations
- 2015 *Snehashish Chakraverty*, National Institute of Technology Rourkela, India
topic: Interval linear equations
- 2012 *Sanaz Rivaz*, Shahid Bahonar University of Kerman, Kerman, Iran,
topic: Multiobjective linear programming with interval coefficients

VISITS

- 2018 University of Salerno, Italy, February 11–16, hosted by *Raffaele Cerulli*
- 2018 University of Salerno, Italy, June 12–17, hosted by *Raffaele Cerulli*
- 2018 project Auctus, INRIA Bordeaux – Sud-Ouest, France, August 20–26, hosted by *David Daney*

STUDENTS

- Bachelor's students: 10 defeated
- Master's students: 5 defeated
- PhD students: 4 currently under supervision
 - *Elif Garajová* (since 2016), Interval linear programming
 - *Matej Moravčík* (since 2014), Algorithms for extensive form games with imperfect information
 - *Martin Schmid* (since 2013), Algorithmic game theory
 - *Jaroslav Horáček* (since 2011), Interval linear and nonlinear systems, Young scientists award from MatTriad'13 and invited speaker to MatTriad'15,

RESEARCH AREA AND AREA OF INTEREST

Interval analysis:

- Interval-valued linear systems and interval matrices; Numerical analysis and matrix theory; Interval-valued regression problems and statistics

Optimization and operations research:

- Global optimization; Linear programming; Multiobjective optimization; Parametric programming and sensitivity analysis; Game theory

COLLABORATION

- *Theoretical properties and interval methods for parametric linear systems* (2015-2017), bilateral agreement, E.D. Popova (Bulgarian Academy of Sciences) and M. Hladík (Charles University in Prague)
- *Data analytics for the optimization of industrial processes and flows under uncertainty* (2018), program for PhD students in Physics, Mathematics and Applications – Curriculum Mathematics, at University of Salerno

MEMBERSHIP

- EUROPT – The Continuous Optimization Working Group of EURO (since 2008)
- JČMF – Union of Czech Mathematicians and Physicists (since 2010)
- SIAM – Society for Industrial and Applied Mathematics (since 2015)
- ILAS – International Linear Algebra Society (since 2016)
- ČSOV – Czech Society for Operations Research (since 2017)
- International Society of Global Optimization (iSoGO, since 2018)

INVITED PLENARY TALKS AT CONFERENCES AND WORKSHOPS

- *The role of interval linear algebra in global optimization*, 1st International Workshop on Trusted Numerical Computations, TNC 2018, June 19–20, Krakow, Poland. Minisymposium at International Conference on Emerging Trends in Applied Mathematics and Mechanics, ETAMM 2018.
- *Interval robustness in linear programming* (in czech), 20th winter school of JČMF, ROBUST 2018, January 21–26, Rybník, Czech Republic.
- *Introduction to interval computation and numerical verification*, invited two lectures, Seminar of numerical analysis and winter school, SNA 2017, January 30 – February 3, 2017, Ostrava, Czech Republic.
- *Interval Programming* (with M. Černý, invited series of 8 lectures), workshop for the 7th International Conference of Iranian Operations Research Society, OR 2014, May 12–13, Semnan, Iran.
- *Optimization with uncertain, inexact or unstable data: Linear programming and the interval approach* (with M. Černý, invited lecture), 10th International Conference on Strategic Management and its Support by Information Systems, SMSIS 2013, August 29–30, Valašské Meziříčí, Czech Republic.
- *New directions in interval linear programming*, 15th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic and Verified Numerical Computations, SCAN 2012, September 23–29, Novosibirsk, Russia.
- *Algorithms, complexity and interval data* (with M. Černý, in czech), 17th summer school of JČMF, ROBUST 2012, September 9–14, Němčičky, Czech Republic.

EDITORIAL BOARD

- Reliable Computing (since 2016)
- International Journal of Fuzzy Computation and Modelling (since 2013)

PROGRAM COMMITTEE MEMBERSHIP

- 14th Global Optimization Workshop, *LeGO 2018*, Leiden, The Netherlands, September 18–21, 2018
- 1st International Workshop on Trusted Numerical Computations, *TNC 2018*, Krakow, Poland, June 19–20, 2018
- The 7th International Conference of Iranian Operation Research Society, *ORO 2014*, Semnan, Iran, May 14–15, 2014

CONFERENCE ORGANIZING

Main organizer:

- 8th Small Workshop on Interval Methods, SWIM 2015, June 9-11, 2015, Prague, Czech Republic. <http://kam.mff.cuni.cz/conferences/swim2015/>

Special sessions:

- Session on *Interval Matrices* at MatTriad 2017 - International Conference on MATRIX Analysis and its Applications, September 25-29, 2017, Będlewo, Poland.

GRANT PROJECTS

Principal investigator:

- *Novel approaches for relaxation and approximation techniques in deterministic global optimization*, 2018–2020, grant P403-18-04735S of the Grant Agency of the Czech Republic.
- *Interval methods for optimization problems*, 2013–2017, grant P402-13-10660S of the Grant Agency of the Czech Republic.

Team member:

- *Decision Making in Uncertain Environment: Stability Analysis and Robustification of Optimization Models*, 2016–2018, grant P403-16-00408S of the Grant Agency of the Czech Republic, principal investigator M. Černý.
- *Center of excellence – Institute for Theoretical Computer Science*, 2012–2018, research center supported by the project P202/12/G061 of GA CR, principal investigator J. Nešetřil.
- *Models of Optimal Economic Decision Making under Instability, Uncertainty and Indeterminacy*, 2012–2015, grant P403/12/1947 of the Grant Agency of the Czech Republic, principal investigator M. Černý.
- *Center for Foundations of Modern Computer Science*, 2018–2023, Charles University research center in the program UNCE, UNCE/SCI/004, principal investigator J. Sgall.
- *Center of Modern Computer Science*, 2012–2017, Charles University research center in the program UNCE, principal investigator J. Sgall.
- *PRVOUK P46 – Computer Science*, 2011–2015, Charles University grant, principal coordinator O. Čepěk.
- *Modern methods, structures and systems of computer science*, 2005–2011, grant MSM0021620838 of the Ministry of education of the Czech Republic, principal investigator J. Kratochvíl.

REFEREE

- Peer review activity: see <https://publons.com/author/1198622/>
- Editors' Award for Excellence in Reviewing, by European Journal of Operational Research, 2018

PAPERS IN JOURNALS

- [1] M. Černý and M. Hladík. Possibilistic linear regression with fuzzy data: Tolerance approach with prior information. *Fuzzy Sets Syst.*, 340:127–144, 2018.
- [2] M. Dehghani-Madiseh and M. Hladík. Efficient approaches for enclosing the united solution set of the interval generalized Sylvester matrix equations. *Appl. Numer. Math.*, 126:18–33, 2018.
- [3] M. Hladík. Bounds for the solutions of absolute value equations. *Comput. Optim. Appl.*, 69(1):243–266, 2018.
- [4] M. Hladík. Testing pseudoconvexity via interval computation. *J. Glob. Optim.*, 71(3):443–455, 2018.
- [5] S. Chakraverty, M. Hladík, and N. R. Mahato. A sign function approach to solve algebraically interval system of linear equations for nonnegative solutions. *Fund. Inform.*, 152(1):13–31, 2017.
- [6] S. Chakraverty, M. Hladík, and D. Behera. Formal solution of an interval system of linear equations with an application in static responses of structures with interval forces. *Appl. Math. Model.*, 50:105–117, 2017.
- [7] M. Hladík. Transformations of interval linear systems of equations and inequalities. *Linear Multilinear Algebra*, 65(2):211–223, 2017.
- [8] M. Hladík. Interval convex quadratic programming problems in a general form. *Cent. Eur. J. Oper. Res.*, 25(3):725–737, 2017.
- [9] M. Hladík. On strong optimality of interval linear programming. *Optim. Lett.*, 11(7):1459–1468, 2017.
- [10] M. Hladík and M. Černý. Two optimization problems in linear regression with interval data. *Optim.*, 66(3):331–349, 2017.
- [11] J. A. dit Sandretto and M. Hladík. Solving over-constrained systems of non-linear interval equations - And its robotic application. *Appl. Math. Comput.*, 313:180–195, 2017.
- [12] I. Skalna and M. Hladík. A new algorithm for Chebyshev minimum-error multiplication of reduced affine forms. *Numer. Algorithms*, 76(4):1131–1152, 2017.
- [13] I. Skalna and M. Hladík. A new method for computing a p-solution to parametric interval linear systems with affine-linear and nonlinear dependencies. *BIT Numer. Math.*, 57(4):1109–1136, 2017.
- [14] M. Černý and M. Hladík. Inverse optimization: towards the optimal parameter set of inverse LP with interval coefficients. *Cent. Eur. J. Oper. Res.*, 24(3):747–762, 2016.
- [15] M. Hladík. An extension of the α BB-type underestimation to linear parametric Hessian matrices. *J. Glob. Optim.*, 64(2):217–231, 2016.
- [16] M. Hladík. Robust optimal solutions in interval linear programming with forall-exists quantifiers. *Eur. J. Oper. Res.*, 254(3):705–714, 2016.
- [17] M. Hladík and M. Černý. First step immersion in interval linear programming with linear dependencies. *Bull. Iranian Math. Soc.*, 42(7):43–53, 2016.
- [18] M. Hladík and J. Rohn. Radii of solvability and unsolvability of linear systems. *Linear Algebra Appl.*, 503:120–134, 2016.
- [19] A. Mostafae, M. Hladík, and M. Černý. Inverse linear programming with interval coefficients. *J. Comput. Appl. Math.*, 292:591–608, 2016.
- [20] S. Rivaz, M. A. Yaghoobi, and M. Hladík. Using modified maximum regret for finding

- a necessarily efficient solution in an interval MOLP problem. *Fuzzy Optim. Decis. Mak.*, 15(3):237–253, 2016.
- [21] A. Shahin, P. Hanafizadeh, and M. Hladík. Sensitivity analysis of linear programming in the presence of correlation among right-hand side parameters or objective function coefficients. *Cent. Eur. J. Oper. Res.*, 24(3):563–593, 2016.
- [22] M. Hladík. On the efficient Gerschgorin inclusion usage in the global optimization α BB method. *J. Glob. Optim.*, 61(2):235–253, 2015.
- [23] M. Hladík. Complexity issues for the symmetric interval eigenvalue problem. *Open Math.*, 13(1):157–164, 2015.
- [24] M. Hladík. AE solutions and AE solvability to general interval linear systems. *Linear Algebra Appl.*, 465(0):221–238, 2015.
- [25] M. Hladík and M. Černý. Total least squares and Chebyshev norm. *Procedia Comput. Sci.*, 51(0):1791–1800, 2015.
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- [27] M. Černý and M. Hladík. The complexity of computation and approximation of the t-ratio over one-dimensional interval data. *Comput. Stat. Data Anal.*, 80(0):26–43, 2014.
- [28] M. Hladík. How to determine basis stability in interval linear programming. *Optim. Lett.*, 8(1):375–389, 2014.
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- [30] M. Hladík. Strong solvability of linear interval systems of inequalities with simple dependencies. *Int. J. Fuzzy Comput. Model.*, 1(1):3–14, 2014.
- [31] M. Hladík. On approximation of the best case optimal value in interval linear programming. *Optim. Lett.*, 8(7):1985–1997, 2014.
- [32] M. Hladík and M. Černý. Tolerance approach to possibilistic nonlinear regression with interval data. *IEEE Trans. Cybern.*, 44(12):2509–2520, 2014.
- [33] M. Hladík and S. Ratschan. Efficient solution of a class of quantified constraints with quantifier prefix exists-forall. *Math. Comput. Sci.*, 8(3-4):329–340, 2014.
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- [35] M. Hladík. Bounds on eigenvalues of real and complex interval matrices. *Appl. Math. Comput.*, 219(10):5584–5591, 2013.
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- [37] M. Hladík and S. Sitarz. Maximal and supremal tolerances in multiobjective linear programming. *Eur. J. Oper. Res.*, 228(1):93–101, 2013.
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- [39] J. Horáček and M. Hladík. Computing enclosures of overdetermined interval linear systems. *Reliab. Comput.*, 19(2):142–155, 2013.
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- Appl. Math. Comput. Sci.*, 22(3):561–574, 2012.
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 - [51] M. Hladík. On the separation of parametric convex polyhedral sets with application in MOLP. *Appl. Math.*, 55(4):269–289, 2010.
 - [52] M. Hladík. Interval valued bimatrix games. *Kybernetika*, 46(3):435–446, 2010.
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 - [55] M. Hladík. Multiparametric linear programming: support set and optimal partition invariancy. *Eur. J. Oper. Res.*, 202(1):25–31, 2010.
 - [56] M. Hladík. Optimal value range in interval linear programming. *Fuzzy Optim. Decis. Mak.*, 8(3):283–294, 2009.
 - [57] M. Hladík. Separation of convex polyhedral sets with column parameters. *Kybernetika*, 44(1):113–130, 2008.
 - [58] M. Hladík. Description of symmetric and skew-symmetric solution set. *SIAM J. Matrix Anal. Appl.*, 30(2):509–521, 2008.
 - [59] M. Hladík. Computing the tolerances in multiobjective linear programming. *Optim. Methods Softw.*, 23(5):731–739, 2008.
 - [60] M. Hladík. Additive and multiplicative tolerance in multiobjective linear programming. *Oper. Res. Lett.*, 36(3):393–396, 2008.
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BOOK CHAPTERS

- [1] M. Hladík. Interval linear programming: A survey. In Z. A. Mann, ed., *Linear Programming – New Frontiers in Theory and Applications*, chapter 2, pages 85–120. Nova Science Publishers, New York, 2012.
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- [1] M. Hladík. Positive semidefiniteness and positive definiteness of a linear parametric interval matrix. In M. Ceberio and V. Kreinovich, eds., *Constraint Programming and Decision Making: Theory and Applications*, volume 100 of *Studies in Systems, Decision and Control*, pages 77–88. Springer, Cham, 2018.
- [2] M. Hladík and M. Černý. The shape of the optimal value of a fuzzy linear programming problem. In P. Melin et al., ed., *Fuzzy Logic in Intelligent System Design*, volume 648 of *Advances in Intelligent Systems and Computing*, pages 281–286. Springer, Cham, 2018.
- [3] O. Král and M. Hladík. Parallel computing of linear systems with linearly dependent intervals in MATLAB. In R. Wyrzykowski et al., ed., *Parallel Processing and Applied Mathematics*, volume 10778 of *LNCS*, pages 391–401. Springer, Cham, 2018.
- [4] S. I. Kumkov, M. Hladík, L. A. Yolshina, and V. A. Yolshina. New information technology on the basis of interval analysis: Estimation of aluminum corrosion parameters in real electrochemical process. In E. Akimova et al., ed., *Proceedings of the 3rd International Workshop on Radio Electronics & Information Technologies, Yekaterinburg, Russia, March 14, 2018*, pages 76–85. CEUR Workshop Proceedings, 2018.
- [5] M. Hladík. On relation between P-matrices and regularity of interval matrices. In N. Bebiano, ed., *Applied and Computational Matrix Analysis*, volume 192 of *Springer Proceedings in Mathematics & Statistics*, pages 27–35. Springer, 2017.
- [6] M. Hladík. On relation of possibly efficiency and robust counterparts in interval multiobjective linear programming. In A. Sforza and C. Sterle, eds., *Optimization and Decision Science: Methodologies and Applications*, volume 217 of *Springer Proceedings in Mathematics & Statistics*, pages 335–343. Springer, Cham, 2017.
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- [8] J. Horáček, M. Hladík, and M. Černý. Interval linear algebra and computational complexity. In N. Bebiano, ed., *Applied and Computational Matrix Analysis*, volume 192 of *Springer Proceedings in Mathematics & Statistics*, pages 37–66. Springer, 2017.
- [9] J. Novotná, M. Hladík, and T. Masařík. Duality gap in interval linear programming. In L. Zadnik Stirn et al., ed., *Proceedings of the 14th International Symposium on Operational Research SOR'17, Bled, Slovenia, September 27-29, 2017*, pages 501–506, Ljubljana, Slovenia, 2017. Slovenian Society Informatika.
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- [13] M. Hladík. Optimal preconditioning for the interval parametric Gauss–Seidel method. In M. Nehmeier et al., ed., *Scientific Computing, Computer Arithmetic, and Validated*

- Numerics: 16th International Symposium, SCAN 2014, Würzburg, Germany, September 21-26*, volume 9553 of *LNCS*, pages 116–125. Springer, 2016.
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 - [15] M. Moravčík, M. Schmid, K. Ha, M. Hladík, and S. J. Gaukroder. Refining subgames in large imperfect information games. In *Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence*, pages 572–578, Palo Alto, California, 2016. AAAI Press.
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- ematics 2011 (ICNAAM-2011), G-Hotels, Halkidiki, Greece, 19-25 September*, volume 1389 of *AIP Conference Proceedings*, pages 882–885, Melville, New York, 2011. American Institute of Physics (AIP).
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