

Yura Malitsky

Curriculum Vitae

Department of Mathematics
Linköping University
s-581 83 Linköping, Sweden
☎ +46 (0)13-28 1401
✉ y.malitsky@gmail.com

Job experience

- 01.10.2020–current **Assistant professor**, *Linköping University*, Department of Mathematics
- 2019–2020 **Postdoc researcher**, *EPFL*, Laboratory for Information and Inference Systems, Group of Prof. Volkan Cevher
- 2017–2019 **Postdoc researcher**, *University of Göttingen*, Institute for Numerical and Applied Mathematics, Group of Prof. Russell D. Luke
- 2015–2016 **Postdoc researcher**, *Graz University of Technology*, Institute for Computer Graphics and Vision, Group of Prof. Thomas Pock

Education

- 2012–2015 **PhD student**, *Taras Shevchenko University of Kyiv*, Faculty of Cybernetics, Applied Mathematics
- 2010–2012 **MSc**, *Taras Shevchenko University of Kyiv*, Faculty of Cybernetics, Applied Mathematics
- 2006–2010 **BSc**, *Taras Shevchenko University of Kyiv*, Faculty of Cybernetics, Applied Mathematics

PhD thesis

- title *Efficient projection methods for variational inequalities and composite optimization problems.*
- supervisor Prof. Volodymyr V. Semenov
- description The dissertation was dedicated to the development of new algorithms for monotone variational inequalities and composite minimization problems.

Fields of interests

- Mathematical optimization
- Nonlinear analysis
- Machine learning
- Algorithms

Awards

- 2015 SIAM Student Paper Award for “Projected reflected gradient method for monotone variational inequalities” (SIAM J. Optimization 25, 2015)

Scholarships and grants

- 2006-2015 Government scholarship
- 2010-2011 Victor Pinchuk Foundation Fellow

- [1] A. Alacaoglu and Y. Malitsky. Stochastic variance reduction for variational inequality methods. 2021. arXiv: [2102.08352](#).
- [2] A. Alacaoglu, Y. Malitsky, and V. Cevher. Convergence of adaptive algorithms for weakly convex constrained optimization. In *NeurIPS*, 2021. arXiv: [2006.06650](#).
- [3] A. Alacaoglu, Y. Malitsky, and V. Cevher. Forward-reflected-backward method with variance reduction. *Comput Optim Appl*, 2021. DOI: [10.1007/s10589-021-00305-3](#).
- [4] F. J. Aragón-Artacho, Y. Malitsky, M. K. Tam, and D. Torregrosa-Belén. Distributed forward-backward methods without central coordination. 2021. arXiv: [2112.00274](#).
- [5] Y. Malitsky and M. K. Tam. Resolvent splitting for sums of monotone operators with minimal lifting. 2021. arXiv: [2108.02897](#).
- [6] M.-L. Vladarean, Y. Malitsky, and V. Cevher. A first-order primal-dual method with adaptivity to local smoothness. In *NeurIPS*, 2021. arXiv: [2110.15148](#).
- [7] A. Alacaoglu, Y. Malitsky, P. Mertikopoulos, and V. Cevher. A new regret analysis for Adam-type algorithms. In *International Conference on Machine Learning*, 2020. arXiv: [2003.09729](#). URL: <http://proceedings.mlr.press/v119/alacaoglu20b.html>.
- [8] Y. Malitsky. Golden ratio algorithms for variational inequalities. *Mathematical Programming*, 184:383–410, 2020. DOI: [10.1007/s10107-019-01416-w](#). arXiv: [1803.08832](#).
- [9] Y. Malitsky and K. Mishchenko. Adaptive gradient descent without descent. In *International Conference on Machine Learning*, 2020. arXiv: [1910.09529](#). URL: <http://proceedings.mlr.press/v119/malitsky20a.html>.
- [10] Y. Malitsky and M. K. Tam. A forward-backward splitting method for monotone inclusions without cocoercivity. *SIAM Journal on Optimization*, 30(2):1451–1472, 2020. DOI: [10.1137/18M1207260](#). arXiv: [1808.04162](#).
- [11] K. Mishchenko, D. Kovalev, E. Shulgin, P. Richtárik, and Y. Malitsky. Revisiting stochastic extragradient. In *International Conference on Artificial Intelligence and Statistics*, 2020. arXiv: [1905.11373](#). URL: <http://proceedings.mlr.press/v108/mishchenko20a.html>.
- [12] E. R. Csetnek, Y. Malitsky, and M. K. Tam. Shadow Douglas-Rachford splitting for monotone inclusions. *Applied Mathematics & Optimization*, 80(3):665–678, 2019. DOI: [10.1007/s00245-019-09597-8](#). arXiv: [1903.03393](#).
- [13] Y. Malitsky and P. Ochs. Model function based conditional gradient method with Armijo-like line search. In *International Conference on Machine Learning*, pages 4891–4900, 2019. arXiv: [1901.08087](#). URL: <http://proceedings.mlr.press/v97/ochs19a/ochs19a.pdf>.
- [14] D. R. Luke and Y. Malitsky. Block-coordinate primal-dual method for nonsmooth minimization over linear constraints. In *Large-Scale and Distributed Optimization*, pages 121–147. Springer, Cham, 2018. DOI: [10.1007/978-3-319-97478-1_6](#). arXiv: [1801.04782](#).
- [15] Y. Malitsky. Proximal extrapolated gradient methods for variational inequalities. *Optimization Methods and Software*, 33(1):140–164, 2018. DOI: [10.1080/10556788.2017.1300899](#). arXiv: [1601.04001](#).
- [16] Y. Malitsky and T. Pock. A first-order primal-dual algorithm with linesearch. *SIAM Journal on Optimization*, 28(1):411–432, 2018. DOI: [10.1137/16M1092015](#). arXiv: [1608.08883](#).
- [17] Y. Malitsky. The primal-dual hybrid gradient method reduces to a primal method for linearly constrained optimization problems. 2017. arXiv: [1706.02602](#).
- [18] Y. Malitsky. Projected reflected gradient methods for monotone variational inequalities. *SIAM Journal on Optimization*, 25(1):502–520, 2015. DOI: [10.1137/14097238X](#). arXiv: [1502.04968](#).
- [19] Y. V. Malitsky and V. Semenov. A hybrid method without extrapolation step for solving variational inequality problems. *Journal of Global Optimization*, 61(1):193–202, 2015. DOI: [10.1007/s10898-014-0150-x](#). arXiv: [1501.07298](#).

- [20] Y. V. Malitsky and V. Semenov. An extragradient algorithm for monotone variational inequalities. *Cybernetics and Systems Analysis*, 50(2):271–277, 2014. DOI: [10.1007/s10559-014-9614-8](https://doi.org/10.1007/s10559-014-9614-8).

Conferences and Workshops

- Stockholm, June, 2022 Abstract “*Adaptive gradient descent without descent*”, Mathematics of Complex Data
- Online, NeurIPS
December, 2021
- Online, October, 2021 Abstract “*A Forward-Backward Splitting Method for Monotone Inclusions Without Cocircivity*”, 2021 INFORMS Annual Meeting
- Online, July, 2020 ICML
- Vienna, February, 2020 Abstract “*Adaptive gradient descent without descent*”, Workshop of the Research Group on “Applied Mathematics with Emphasis on Optimization
- Cluj-Napoca, April, 2019 Abstract “*Golden ratio algorithm for variational inequalities*”, Games, Dynamics, Optimization–2019
- Vienna, February, 2019 Abstract “*On a new method for monotone inclusions*”, ESI workshop: Numerical Algorithms in Nonsmooth Optimization
- Vienna, December, 2018 Abstract: “*Bilevel composite minimization problems*”, Vienna Workshop on Computational Optimization
- Marburg, November, 2018 Abstract: “*Primal-dual algorithm for linearly constrained optimization problem*”, 4th Central European Set-Valued and Variational Analysis Meeting
- Bordeaux, July, 2018 Abstract: “*Primal-dual algorithm for linearly constrained optimization problem*”, 23rd International Symposium on Mathematical Programming
- Malta, May, 2018 Abstract: “*Primal-dual algorithm for linearly constrained optimization problem*”, 9th International Conference on Inverse Problems: Modeling and Simulation
- Chemnitz, November, 2017 Abstract: “*Golden ratio algorithms for variational inequalities*”, 3rd Central European Set-Valued and Variational Analysis Meeting
- Oaxaca, Mexico, September, 2017 Abstract: “*Golden ratio algorithms for variational inequalities*”, Splitting Algorithms, Modern Operator Theory, and Applications
- Vancouver, May, 2017 Abstract: “*Novel methods for saddle point problems*”, SIAM Conference on Optimization
- Münster, February, 2017 Abstract: “*A first-order primal-dual algorithm with linesearch*”, with T. Pock, Workshop: Shape, Images and Optimization.
- Graz, September, 2016 Abstract: “*A first-order primal-dual algorithm with linesearch*”, with T. Pock, SFB Workshop: Imaging with Modulated/Incomplete Data 2016
- Tokyo, August, 2016 Abstract: “*New Projection Methods for Monotone Variational Inequalities*”, The Fifth International Conference on Continuous Optimization (ICCOPT-2016).
- Poznan, July, 2016 Abstract: “*Proximal extrapolated gradient methods for variational inequalities*”, 28th European Conference on Operational Research.
- Kyiv, October, 2014 Abstract: “*A Douglas-Rachford method for best approximation pair for two disjoint intersections of closed convex sets*”, VI International Conference ‘Computational and Applied Mathematics’ dedicated to Ivan Lyashko.
- Heidelberg, September, 2013 1 Heidelberg Laureate Forum.
- Kyiv, September, 2013 Abstract: “*A Variant of Tseng’s Splitting Method for Monotone Inclusion Problem*”, V International Conference ‘Computational and Applied Mathematics’
- Kyiv, September, 2012 Abstract: “*The approximation of a common fixed point of a finite number of Fejér mappings in Hilbert space*”, V International Conference ‘Computational and Applied Mathematics’

Referee service

- Mathematical Programming
- SIAM J. Optimization
- Mathematical Methods of Operations Research
- Computational Optimization and Application
- Journal on Optimization Theory and Application
- Journal of Mathematical Imaging and Vision
- Journal of Global Optimization
- Journal of Scientific Computing
- Set-Valued and Variational Analysis
- Operations Research Letters
- Numerical Algorithms
- Inverse Problems
- Optimization
- Optimization Letters
- NeurIPS
- ICML
- ICLR
- COLT

Teaching experience

- 2022 WASP PhD course: WASP Artificial Intelligence and Machine Learning
- 2022 WASP PhD course: Mathematics for Machine Learning
- 2022 Nonlinear Optimization
- 2021 Vienna Graduate School on Computational Optimization: “Continuous Optimization: between Mathematics and Computation”
- 2018-2019 Numerical methods I — Teaching assistant
- 2014-2015 Analysis I — Teaching assistant
- 2013-2014 Analysis II — Teaching assistant
- 2013-2014 Functional analysis — Teaching assistant
- 2006-2014 Olympiad mathematics for high school students

Languages

- Ukrainian native
- Russian fluent
- English fluent
- German intermediate (B1)

Computer skills

- Programming language Python
- Other Linux, git, emacs

Awards in the national and international competitions in mathematics

- 2008, 2009 **Silver Medal**, *4th, 5th Internet Mathematical Olympiads for Students*, Ariel University Center, Israel
- 2008 **3rd Prize**, *69th William Lowell Putnam Mathematics Competition*, Faculty of Mechanics and Mathematics, Taras Shevchenko National University of Kyiv
- 2005, 2006 **3rd Prize**, *45th and 46th Ukrainian National Mathematics Competition for high school students*

Participation at schools

- Austria, 2014 Gene Golub SIAM Summer School 2014. "Simulation, Optimization, and Identification in Solid Mechanics", Linz.
- Czech, 2012 Spring School on Analysis 2012. "Variational Analysis and its Applications", Paseky nad Jizerou.
- Czech, 2011 Spring School on Analysis 2011. "Functional Spaces, Approximation, Inequalities", Paseky nad Jizerou.

Social activities

- 2009-2015 Member of jury of the Ukrainian Mathematical Olympiad (high-school level)
Training sessions for regional, Ukrainian and International mathematics competitions (high-school level)
Member of the creating and selection problem committee for Ukrainian mathematical competitions (high-school level)
- 2009-2014 Teacher at Summer Math Schools