Yura Malitsky

Curriculum Vitae

Faculty of Mathematics
University of Vienna
Oskar-Morgenstern-Platz 1
1090 Vienna, Austria
y.malitsky@gmail.com

Job experience

01.03.2023–current **Assistant professor in Computational Optimization**, *University of Vienna*, Faculty of Mathematics

2020–2023 **Assistant professor**, *Linkoping Univesity*, 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

2022 Knut and Alice Wallenberg Foundation Prize, co-PI. Together with Erik G. Larsson (PI), Carlo Fischione (co-PI), and Mikael Johansson (co-PI). Total: SEK 30 mln

2020-2023 Wallenberg AI, Autonomous Systems and Software Program Faculty

2006-2015 Ukrainian government scholarship

2010-2011 Victor Pinchuk Foundation Fellow

Publication

[1] A. Alacaoglu, A. Böhm, and Y. Malitsky. Beyond the golden ratio for variational inequality algorithms. 2022. arXiv: 2212.13955.

[2] A. Alacaoglu and Y. Malitsky. Stochastic variance reduction for variational inequality methods. In *Proceedings of Thirty Fifth Conference on Learning Theory*, volume 178, pages 778–816. PMLR, 2022. arXiv: 2102.08352. URL: https://proceedings.mlr.press/v178/alacaoglu22a.html.

[3] F. J. Aragón-Artacho, Y. Malitsky, M. K. Tam, and D. Torregrosa-Belén. Distributed forward-backward methods for ring networks. *Computational optimization and applications*, 2022. DOI: 10.1007/s10589-022-00400-z. arXiv: 2112.00274.

[4] Z. Chen, E. G. Larsson, C. Fischione, M. Johansson, and Y. Malitsky. Over-the-air computation for distributed systems: something old and something new. 2022. arXiv: 2211.00767.

[5] Z. Chen and Y. Malitsky. Over-the-air computation with multiple receivers: a space-time approach. 2022. arXiv: 2208.11751.

[6] Y. Malitsky and M. K. Tam. Resolvent splitting for sums of monotone operators with minimal lifting. *Mathematical Programming*, 2022. DOI: 10.1007/s10107-022-01906-4. arXiv: 2108.02897.

[7] A. Alacaoglu, Y. Malitsky, and V. Cevher. Convergence of adaptive algorithms for weakly convex constrained optimization. In *NeurIPS*, volume 34, pages 14214–14225, 2021. arXiv: 2006.06650. URL: https://papers.nips.cc/paper/2021/hash/76c073d8a82d9ddaf993300be03ac70f-Abstract.html.

[8] A. Alacaoglu, Y. Malitsky, and V. Cevher. Forward-reflected-backward method with variance reduction. *Computational optimization and applications*, 80(2):321–346, 2021. DOI: 10.1007/s10589-021-00305-3.

[9] M.-L. Vladarean, Y. Malitsky, and V. Cevher. A first-order primal-dual method with adaptivity to local smoothness. In *NeurIPS*, volume 34, pages 6171–6182, 2021. arXiv: 2110.15148. URL: https://papers.nips.cc/paper/2021/hash/310b60949d2b6096903d7e8a539b20f5-Abstract.html.

[10] 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.

[11] Y. Malitsky. Golden ratio algorithms for variational inequalities. *Mathematical Programming*, 184:383–410, 2020. DOI: 10.1007/s10107-019-01416-w. arXiv: 1803.08832.

[12] 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.

[13] 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.

[14] 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.

[15] 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.

[16] 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.

[17] 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.

[18] 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.

[19] 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.

[20] Y. Malitsky. The primal-dual hybrid gradient method reduces to a primal method for linearly constrained optimization problems. 2017. arXiv: 1706.02602.

[21] 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.

[22] 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.

[23] 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.

Conferences and Workshops

Stockholm, June, 2022	Abstract *"Adaptive gradient descent without descent"*, Mathematics of Complex Data
Online, December, 2021	NeurIPS
Online, October, 2021	Abstract *"A Forward-Backward Splitting Method for Monotone Inclusions Without Cocoercivity"*, 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 Master course: Mathematical Optimization

2022 WASP PhD course: WASP Artificial Intelligence and Machine Learning

2022 WASP PhD course: Mathematics for Machine Learning

2022 PhD course: 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 beginner (A2)

Computer skills

Programming language	Python, Julia
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