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Curriculum Vitae: Anton Rodomanov

PERSONAL INFORMATION

- Born on 22/01/1994, Russian citizenship, married, 1 daughter.
- E-mail: anton.rodomanov@cispa.de.
- Web-page: arodomanov.github.io.
- Address: Saarbrücken, Germany.
- Languages: English (advanced), German (basic), French (basic), Russian (native).

RESEARCH INTERESTS

Convex Optimization, Numerical Algorithms, Complexity Estimates, Randomized Methods, Machine Learning, Statistics.

EDUCATION

PhD in Mathematical Engineering — **2019–22**
Catholic University of Louvain (UCLouvain), Department of Mathematical Engineering (INMA) — Louvain-la-Neuve, Belgium
Thesis: Quasi-Newton Methods with Provable Efficiency Guarantees.
Advisor: Yurii Nesterov.

MSc in Computer Science — **2015–17**
Higher School of Economics, Faculty of Computer Science — Moscow, Russia
Thesis: A Superlinearly-Convergent Proximal Newton-Type Method for the Optimization of Finite Sums.
Advisors: Dmitry Kropotov and Dmitry Vetrov.

BSc in Computer Science — **2011–15**
Lomonosov Moscow State University, Faculty of Computational Mathematics and Cybernetics — Moscow, Russia
Thesis: Development of a Stochastic Optimization Method for Machine Learning Problems with Big Data.
Advisors: Dmitry Kropotov and Dmitry Vetrov.

WORK EXPERIENCE

Postdoctoral Researcher — **01/09/2023 – now**
CISPA Helmholtz Center for Information Security. — Saarbrücken, Germany

Postdoctoral Researcher — **01/09/2022 – 31/08/2023**
ICTEAM Institute at UCLouvain. — Louvain-la-Neuve, Belgium

Doctoral Candidate — **23/01/2019 – 31/08/2022**
Department of Mathematical Engineering (INMA) at UCLouvain. — Louvain-la-Neuve, Belgium

Lecturer — **02/10/2017 – 31/08/2018**
Samsung-HSE Lab at Higher School of Economics. — Moscow, Russia

Research Assistant — **09/01/2017 – 18/01/2019**
International Laboratory of Deep Learning and Bayesian Methods at Higher School of Economics. — Moscow, Russia

PUBLICATIONS

Preprints

Stabilized Proximal-Point Methods for Federated Optimization — **2024**
X. Jiang, A. Rodomanov, S. Stich. [arXiv]

Universality of AdaGrad Stepsizes for Stochastic Optimization: Inexact Oracle, Acceleration and Variance Reduction — **2024**
A. Rodomanov, X. Jiang, S. Stich. [arXiv]

Global Complexity Analysis of BFGS **2024**
A. Rodomanov. [arXiv]

Gradient Methods for Stochastic Optimization in Relative Scale **2023**
Y. Nesterov and A. Rodomanov. [arXiv]

Conference and workshop papers

Non-convex Stochastic Composite Optimization with Polyak Momentum **2024**
Y. Gao, A. Rodomanov, S. Stich. ICML 2024:14826–14843. [url] [pdf] [arXiv]

Federated Optimization with Doubly Regularized Drift Correction **2024**
X. Jiang, A. Rodomanov, S. Stich. ICML 2024:21912–21945. [url] [pdf] [arXiv]

Universal Gradient Methods for Stochastic Convex Optimization **2024**
A. Rodomanov, A. Kavis, Y. Wu, K. Antonakopoulos, V. Cevher. ICML 2024:42620–42646. [url] [pdf] [arXiv]

Polynomial Preconditioning for Gradient Methods **2023**
N. Doikov and A. Rodomanov. ICML 2023:8162–8187. [url] [pdf] [arXiv]

A Superlinearly-Convergent Proximal Newton-Type Method for the Optimization of Finite Sums **2016**
A. Rodomanov and D. Kropotov. ICML 2016:2597–2605. [url] [pdf] [supplementary] [code]

Primal-Dual Method for Searching Equilibrium in Hierarchical Congestion Population Games **2016**
P. Dvurechensky, A. Gasnikov, E. Gasnikova, S. Matsievsky, A. Rodomanov, I. Usik. DOOR-SUP 2016:584-595. [url] [arXiv]

A Newton-type Incremental Method with a Superlinear Rate of Convergence **2015**
A. Rodomanov and D. Kropotov. OPT15@NIPS. [url]

Putting MRFs on a Tensor Train **2014**
A. Novikov, A. Rodomanov, A. Osokin, D. Vetrov. ICML 2014:811–819. [url] [pdf] [supplementary] [poster] [slides] [code]

Journal articles

Subgradient ellipsoid method for nonsmooth convex problems **2022**
A. Rodomanov and Y. Nesterov. Math. Program. [url] [arXiv]

New Results on Superlinear Convergence of Classical Quasi-Newton Methods **2021**
A. Rodomanov and Y. Nesterov. J. Optim. Theory Appl. 188:744–769. [url] [arXiv]

Rates of superlinear convergence for classical quasi-Newton methods **2021**
A. Rodomanov and Y. Nesterov. Math. Program. [url] [arXiv]

Greedy Quasi-Newton Methods with Explicit Superlinear Convergence **2021**
A. Rodomanov and Y. Nesterov. SIAM J. Optim. 31(1):785–811. [url] [arXiv]

Smoothness Parameter of Power of Euclidean Norm **2020**
A. Rodomanov and Y. Nesterov. J. Optim. Theory Appl. 185:303–326. [url]

A Randomized Coordinate Descent Method with Volume Sampling **2020**
A. Rodomanov and D. Kropotov. SIAM J. Optim. 30(3):1878–1904. [url] [arXiv]

TALKS AT CONFERENCES AND SEMINARS

Universality of AdaGrad Stepsizes for Stochastic Optimization: Inexact Oracle, Acceleration and Variance Reduction **Jun, Jul, Aug 2024**
FGS Conference on Optimization [slides] Gijón, Spain
EURO Conference on Operational Research [slides] Copenhagen, Denmark
ALGOPT Workshop on Algorithmic Optimization [slides] Louvain-la-Neuve, Belgium

Universal Gradient Methods for Stochastic Convex Optimization **Mar, Apr 2024**
MOP Research Seminar on Mathematical Optimization [slides] online
Research Seminar at CORE [slides] Louvain-la-Neuve, Belgium

Gradient Methods for Stochastic Optimization in Relative Scale — **Mar, May 2023**
Research Seminar of DAO team at Université Grenoble Alpes [slides] — Grenoble, France
SIAM Conference on Optimization (OP23) [slides] — Seattle, USA

Modern analysis of local convergence for classical quasi-Newton methods — **Mar 2023**
Maths Job Market Seminar at Toulouse School of Economics [slides] — Toulouse, France

Universal Stochastic Gradient Methods for Convex Optimization — **Jan 2023**
Research Seminar at CISPA Helmholtz Center for Information Security [slides] — Saarbrücken, Germany

Subgradient Ellipsoid Method for Nonsmooth Convex Problems — **May 2022**
20th French-German-Portugese Conference on Optimization (FGP22) [slides] — Porto, Portugal

New Results on Superlinear Convergence of Classical Quasi-Newton Methods — **Mar, Jul 2021**
XIII Symposium of Numerical Analysis and Optimization [slides] — Curitiba, Brazil (online)
18th Workshop on Advances in Continuous Optimization (EUROPT 2021) [slides] — Toulouse, France (online)

Greedy Quasi-Newton Method with Explicit Superlinear Convergence — **Jun, Aug, Sep, Oct 2019**
17th Workshop on Advances in Continuous Optimization (EUROPT 2019) [slides] — Glasgow, UK
Sixth International Conference on Continuous Optimization (ICCOPT 2019) [slides] — Berlin, Germany
19th French-German-Swiss Conference on Optimization (FGS'2019) [slides] — Nice, France
Seminar in Mathematical Engineering at UCLouvain [slides] — Louvain-la-Neuve, Belgium

Lecture: Introduction to Stochastic Optimization — **Aug 2018**
DeepBayes Summer School [slides] [video] — Moscow, Russia

Adaptive gradient methods for stochastic and online optimization — **Feb 2018**
Seminar on Bayesian Methods in Machine Learning [slides] — Moscow, Russia

Incremental Newton Method for Big Sums of Functions — **Oct 2016**
Seminar on Stochastic Analysis in Problems, IUM [slides (in Russian)] [video (in Russian)] — Moscow, Russia

A Superlinearly-Convergent Proximal Newton-Type Method for the Optimization of Finite Sums — **Jun 2016**
International Conference on Machine Learning (ICML) [slides] [video] — New York, USA

Optimization Methods for Big Sums of Functions — **Jun 2016**
Deep Machine Intelligence Workshop at Skoltech [slides] — Moscow, Russia

Incremental Newton Method for Minimizing Big Sums of Functions — **May 2016**
HSE off-site seminar on Machine Learning [slides] — Voronovo, Russia

Introduction to the Tensor Train Decomposition and Its Applications in Machine Learning — **Mar 2016**
Seminar on Applied Linear Algebra at HSE [slides] — Moscow, Russia

Proximal Incremental Newton Method — **Feb 2016**
Seminar on Bayesian Methods in Machine Learning [slides] — Moscow, Russia

Probabilistic Graphical Models: a Tensorial Perspective — **Aug 2015**
International Conference on Matrix Methods in Mathematics and Applications (MMMA) [slides] — Moscow, Russia

A Fast Incremental Optimization Method with a Superlinear Rate of Convergence — **Jun 2015**
Summer School on Control, Information and Optimization [slides] — Solnechnogorsk, Russia

Markov Chains and Spectral Theory — **Oct 2014**
Seminar on Bayesian Methods in Machine Learning [slides (in Russian)] — Moscow, Russia

Low-Rank Representation of MRF Energy by means of the TT-Format — **May 2014**
SIAM Conference in Imaging Science (SIAM-IS) [slides] — Hong-Kong, China

Fast Gradient Method — **Apr 2014**
Seminar on Bayesian Methods in Machine Learning [slides (in Russian)] — Moscow, Russia

TT-Decomposition for Compact Representation of Tensors — **Oct 2013**
Seminar on Bayesian Methods in Machine Learning [slides (in Russian)] — Moscow, Russia

POSTERS

Universal Gradient Methods for Stochastic Convex Optimization — **Jul 2024**
Joint with A. Kavis, Y. Wu, K. Antonakopoulos, V. Cevher. ICML 2024. [pdf] — Vienna, Austria

Randomized Minimization of Eigenvalue Functions — **Jan 2023**
Joint with Y. Nesterov. Optimization and Statistical Learning Workshop. [pdf] — Les Houches, France

Quasi-Newton and Second-Order Methods for Convex Optimization — **Oct 2021**
Joint with N. Doikov and Y. Nesterov. ICTEAM Welcome Day. [pdf] — Louvain-la-Neuve, Belgium

A Superlinearly-Convergent Proximal Newton-Type Method for the Optimization of Finite Sums — **Jun 2016**
Joint with D. Kropotov. ICML 2016. [pdf] — New York, USA

A Newton-type Incremental Method with a Superlinear Convergence Rate — **Dec 2015**
Joint with D. Kropotov. OPT15@NIPS. [pdf] — Montreal, Canada

A Fast Incremental Optimization Method with a Superlinear Rate of Convergence — **Jul 2015**
Joint with D. Kropotov. Microsoft Research PhD Summer School. [pdf] — Cambridge, UK

Putting MRFs on a Tensor Train — **Jun 2014**
Joint with A. Novikov, A. Osokin and D. Vetrov. ICML 2014. [pdf] — Beijing, China

RESEARCH VISITS

UCLouvain — **Apr 2024**
Hosted by Yurii Nesterov. — Louvain-la-Neuve, Belgium

DAO team at Université Grenoble Alpes — **Mar 2023**
Hosted by Jérôme Malick. — Grenoble, France

CISPA Helmholtz Center for Information Security — **Jan 2023**
Hosted by Sebastian U. Stich. — Saarbrücken, Germany

Laboratory for Information and Inference Systems (LIONS) at EPFL — **Jul, Nov 2022**
Hosted by Volkan Cevher. — Lausanne, Switzerland

AWARDS

Increased State Academic Scholarship for research and academic achievements, at Higher School of Economics — **2017**

Golden HSE Award in the Silver Nestling nomination, at Higher School of Economics — **2016**

Scholarship of the Lukoil Fund, at Higher School of Economics — **2016**

Ilya Segalovich Scholarship (from Yandex), at Higher School of Economics — **2016**

Travel award, at International Conference on Machine Learning (ICML) — **2016**

Best thesis award (1st place), at Lomonosov Moscow State University — **2015**

TEACHING EXPERIENCE

Optimization Models and Methods II, exercise sessions — **2021–22**
Graduate-level course at UCLouvain. Lectures by François Glineur and Geovani Grapiglia. — Louvain-la-Neuve, Belgium

Optimization Methods in Machine Learning, exercise sessions — **2015–18**
Graduate-level course at Lomonosov Moscow State University, Yandex School of Data Analysis and Moscow Institute of Physics and Technology. Lectures by Dmitry Kropotov. — Moscow, Russia

Continuous Optimization, exercise sessions **2017–18**
Undergraduate-level course at Higher School of Economics. Lectures by Dmitry Kropotov. Moscow, Russia

Machine Learning, exercise sessions **2015**
Graduate-level course at Skoltech. Lectures by Victor Kitov. Moscow, Russia

REVIEWING

- **Journals:** Mathematical Programming, SIAM Journal on Optimization (SIOPT), Journal of Optimization Theory and Applications (JOTA), Journal of Machine Learning Research (JMLR), Automatica.
- **Conferences:** Conference on Neural Information Processing Systems (NeurIPS), International Conference on Machine Learning (ICML).