

# Pavel Dvurechensky publication list

## 2014

1. P. E. Dvurechensky and G. E. Ivanov. “Algorithms for computing Minkowski operators and their application in differential games”. In: *Computational Mathematics and Mathematical Physics* 54.2 (2014), pp. 235–264.

## 2015

1. P. Dvurechensky, Y. Nesterov, and V. Spokoiny. “Primal-Dual Methods for Solving Infinite-Dimensional Games”. In: *Journal of Optimization Theory and Applications* 166.1 (July 2015), pp. 23–51.
2. A. Gasnikov, P. Dvurechensky, D. Kamzolov, Y. Nesterov, V. Spokoiny, P. Stetsyuk, A. Suvorikova, and A. Chernov. “Searching for equilibriums in multistage transport models”. In: *Proceedings of Moscow Institute of Physics and Technology* 7.4 (2015). In Russian, pp. 143–155.
3. A. Gasnikov, E. Gasnikova, P. Dvurechensky, E. Ershov, and A. Lagunovskaya. “Search for the stochastic equilibria in the transport models of equilibrium flow distribution”. In: *Proceedings of Moscow Institute of Physics and Technology* 7.4 (2015). In Russian, pp. 114–128.

## 2016

1. L. Bogolubsky, P. Dvurechensky, A. Gasnikov, G. Gusev, Y. Nesterov, A. M. Raigorodskii, A. Tikhonov, and M. Zhukovskii. “Learning Supervised PageRank with Gradient-Based and Gradient-Free Optimization Methods”. In: *Advances in Neural Information Processing Systems 29*. Ed. by D. D. Lee, M. Sugiyama, U. V. Luxburg, I. Guyon, and R. Garnett. arXiv:1603.00717. Curran Associates, Inc., 2016, pp. 4914–4922.
2. A. Chernov, P. Dvurechensky, and A. Gasnikov. “Fast Primal-Dual Gradient Method for Strongly Convex Minimization Problems with Linear Constraints”. In: *Discrete Optimization and Operations Research: 9th International Conference, DOOR 2016, Vladivostok, Russia, September 19-23, 2016, Proceedings*. Ed. by Y. Kochetov, M. Khachay, V. Beresnev, E. Nurminski, and P. Pardalos. Springer International Publishing, 2016, pp. 391–403.
3. P. Dvurechensky and A. Gasnikov. “Stochastic Intermediate Gradient Method for Convex Problems with Stochastic Inexact Oracle”. In: *Journal of Optimization Theory and Applications* 171.1 (2016), pp. 121–145.
4. P. Dvurechensky, A. Gasnikov, E. Gasnikova, S. Matsievsky, A. Rodomanov, and I. Usik. “Primal-Dual Method for Searching Equilibrium in Hierarchical Congestion Population Games”. In: *Supplementary Proceedings of the 9th International Conference on Discrete Optimization and Operations Research and Scientific School (DOOR 2016) Vladivostok, Russia, September 19 - 23, 2016*. arXiv:1606.08988. 2016, pp. 584–595.
5. A. V. Gasnikov and P. E. Dvurechensky. “Stochastic intermediate gradient method for convex optimization problems”. In: *Doklady Mathematics* 93.2 (Mar. 2016), pp. 148–151.
6. A. Gasnikov, P. Dvurechensky, and Y. Nesterov. “Stochastic gradient methods with inexact oracle”. In: *Proceedings of Moscow Institute of Physics and Technology* 8.1 (2016). In Russian, first appeared in arXiv:1411.4218, pp. 41–91.
7. A. Gasnikov, P. Dvurechensky, V. Spokoiny, P. Stetsyuk, and A. Suvorikova. “Superposition of the balancing algorithm and the universal gradient method for search of the regularized Wasserstein brycenter and equilibria in multistage transport models”. In: *Proceedings of Moscow Institute of Physics and Technology* 8.3 (2016). In Russian, pp. 5–24.
8. A. Gasnikov, P. Dvurechensky, and I. Usmanova. “On accelerated randomized methods”. In: *Proceedings of Moscow Institute of Physics and Technology* 8.2 (2016). In Russian, first appeared in arXiv:1508.02182, pp. 67–100.

## 2017

1. A. S. Anikin, A. V. Gasnikov, P. E. Dvurechensky, A. I. Tyurin, and A. V. Chernov. “Dual approaches to the minimization of strongly convex functionals with a simple structure under affine constraints”. In: *Computational Mathematics and Mathematical Physics* 57.8 (2017), pp. 1262–1276.
2. P. Dvurechensky. “Gradient Method With Inexact Oracle for Composite Non-Convex Optimization”. In: *arXiv:1703.09180* (2017).
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## 2018

1. A. Bayandina, P. Dvurechensky, A. Gasnikov, F. Stonyakin, and A. Titov. “Mirror Descent and Convex Optimization Problems With Non-Smooth Inequality Constraints”. In: *Large-Scale and Distributed Optimization*. Ed. by P. Giselsson and A. Rantzer. arXiv:1710.06612. Springer International Publishing, 2018. Chap. 8, pp. 181–215.
2. P. E. Dvurechensky, A. V. Gasnikov, and A. A. Lagunovskaya. “Parallel Algorithms and Probability of Large Deviation for Stochastic Convex Optimization Problems”. In: *Numerical Analysis and Applications* 11.1 (Jan. 2018). arXiv:1701.01830, pp. 33–37.
3. P. Dvurechensky, D. Dvinskikh, A. Gasnikov, C. A. Uribe, and A. Nedić. “Decentralize and Randomize: Faster Algorithm for Wasserstein Barycenters”. In: *Advances in Neural Information Processing Systems 31*. Ed. by S. Bengio, H. Wallach, H. Larochelle, K. Grauman, N. Cesa-Bianchi, and R. Garnett. NeurIPS 2018. arXiv:1806.03915. Curran Associates, Inc., 2018, pp. 10783–10793.
4. P. Dvurechensky, A. Gasnikov, and A. Kroshnin. “Computational Optimal Transport: Complexity by Accelerated Gradient Descent Is Better Than by Sinkhorn’s Algorithm”. In: *Proceedings of the 35th International Conference on Machine Learning*. Ed. by J. Dy and A. Krause. Vol. 80. Proceedings of Machine Learning Research. arXiv:1802.04367. 2018, pp. 1367–1376.
5. P. Dvurechensky and Y. Nesterov. *Global performance guarantees of second-order methods for unconstrained convex minimization*. CORE Discussion Paper 2018/32. CORE UCL, 2018.
6. A. V. Gasnikov, P. E. Dvurechensky, M. E. Zhukovskii, S. V. Kim, S. S. Plaunov, D. A. Smirnov, and F. A. Noskov. “About the Power Law of the PageRank Vector Component Distribution. Part 2. The Buckley–Osthus Model, Verification of the Power Law for This Model, and Setup of Real Search Engines”. In: *Numerical Analysis and Applications* 11.1 (2018), pp. 16–32.
7. C. A. Uribe, D. Dvinskikh, P. Dvurechensky, A. Gasnikov, and A. Nedić. “Distributed Computation of Wasserstein Barycenters Over Networks”. In: *2018 IEEE Conference on Decision and Control (CDC)*. arXiv:1803.02933. 2018, pp. 6544–6549.

## 2019

1. D. R. Baimurzina, A. V. Gasnikov, E. V. Gasnikova, P. E. Dvurechensky, E. I. Ershov, M. B. Kubentaeva, and A. A. Lagunovskaya. “Universal Method of Searching for Equilibria and Stochastic Equilibria in Transportation Networks”. In: *Computational Mathematics and Mathematical Physics* 59.1 (2019). arXiv:1701.02473, pp. 19–33.
2. D. Dvinskikh, E. Gorbunov, A. Gasnikov, P. Dvurechensky, and C. A. Uribe. “On Primal and Dual Approaches for Distributed Stochastic Convex Optimization over Networks”. In: *2019 IEEE 58th Conference on Decision and Control (CDC)*. arXiv:1903.09844. 2019, pp. 7435–7440. DOI: 10.1109/CDC40024.2019.9029798.
3. D. Dvinskikh, A. Ogaltsov, A. Gasnikov, P. Dvurechensky, and V. Spokoiny. “Adaptive Gradient Descent for Convex and Non-Convex Stochastic Optimization”. In: *arXiv:1911.08380* (2019).
4. P. Dvurechensky, M. Staudigl, and C. A. Uribe. “Generalized Self-concordant Hessian-barrier algorithms”. In: *arXiv:1911.01522* (2019). WIAS Preprint No. 2693.

5. A. V. Gasnikov, P. E. Dvurechensky, F. S. Stonyakin, and A. A. Titov. “An Adaptive Proximal Method for Variational Inequalities”. In: *Computational Mathematics and Mathematical Physics* 59.5 (May 2019), pp. 836–841. DOI: 10.1134/S0965542519050075.
6. A. Gasnikov, P. Dvurechensky, E. Gorbunov, E. Vorontsova, D. Selikhanovych, and C. A. Uribe. “Optimal Tensor Methods in Smooth Convex and Uniformly Convex Optimization”. In: *Proceedings of the Thirty-Second Conference on Learning Theory*. Ed. by A. Beygelzimer and D. Hsu. Vol. 99. Proceedings of Machine Learning Research. arXiv:1809.00382. Phoenix, USA: PMLR, 25–28 Jun 2019, pp. 1374–1391.
7. A. Gasnikov et al. “Near Optimal Methods for Minimizing Convex Functions with Lipschitz  $p$ -th Derivatives”. In: *Proceedings of the Thirty-Second Conference on Learning Theory*. Ed. by A. Beygelzimer and D. Hsu. Vol. 99. Proceedings of Machine Learning Research. arXiv:1809.00382. Phoenix, USA: PMLR, 25–28 Jun 2019, pp. 1392–1393.
8. S. V. Guminov, Y. E. Nesterov, P. E. Dvurechensky, and A. V. Gasnikov. “Accelerated Primal-Dual Gradient Descent with Linesearch for Convex, Nonconvex, and Nonsmooth Optimization Problems”. In: *Doklady Mathematics* 99.2 (Mar. 2019), pp. 125–128.
9. A. Kroshnin, N. Tupitsa, D. Dvinskikh, P. Dvurechensky, A. Gasnikov, and C. Uribe. “On the Complexity of Approximating Wasserstein Barycenters”. In: *Proceedings of the 36th International Conference on Machine Learning*. Ed. by K. Chaudhuri and R. Salakhutdinov. Vol. 97. Proceedings of Machine Learning Research. arXiv:1901.08686. Long Beach, California, USA: PMLR, Sept. 2019, pp. 3530–3540.
10. F. S. Stonyakin et al. “Gradient Methods for Problems with Inexact Model of the Objective”. In: *Mathematical Optimization Theory and Operations Research*. Ed. by M. Khachay, Y. Kochetov, and P. Pardalos. arXiv:1902.09001. Cham: Springer International Publishing, 2019, pp. 97–114.
11. E. A. Vorontsova, A. V. Gasnikov, E. A. Gorbunov, and P. E. Dvurechenskii. “Accelerated Gradient-Free Optimization Methods with a Non-Euclidean Proximal Operator”. In: *Automation and Remote Control* 80.8 (2019), pp. 1487–1501.

## 2020

1. D. Dvinskikh, A. Ogaltsov, A. Gasnikov, P. Dvurechensky, and V. Spokoiny. “On the line-search gradient methods for stochastic optimization”. In: *IFAC-PapersOnLine* 53.2 (2020). arXiv:1911.08380, pp. 1715–1720. DOI: <https://doi.org/10.1016/j.ifacol.2020.12.2284>.
2. P. Dvurechensky, A. Gasnikov, S. Omelchenko, and A. Tiurin. “A Stable Alternative to Sinkhorn’s Algorithm for Regularized Optimal Transport”. In: *Mathematical Optimization Theory and Operations Research*. Ed. by A. Kononov, M. Khachay, V. A. Kalyagin, and P. Pardalos. Cham: Springer International Publishing, 2020, pp. 406–423.
3. P. Dvurechensky, P. Ostroukhov, K. Safin, S. Shtern, and M. Staudigl. “Self-Concordant Analysis of Frank-Wolfe Algorithms”. In: *Proceedings of the 37th International Conference on Machine Learning*. Ed. by H. D. III and A. Singh. Vol. 119. Proceedings of Machine Learning Research. arXiv:2002.04320. Virtual: PMLR, 13–18 Jul 2020, pp. 2814–2824.
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5. D. Kamzolov, A. Gasnikov, and P. Dvurechensky. “Optimal Combination of Tensor Optimization Methods”. In: *Optimization and Applications*. Ed. by N. Olenev, Y. Evtushenko, M. Khachay, and V. Malkova. arXiv:2002.01004. Cham: Springer International Publishing, 2020, pp. 166–183.
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8. N. Tupitsa, P. Dvurechensky, A. Gasnikov, and C. A. Uribe. “Multimarginal Optimal Transport by Accelerated Alternating Minimization”. In: *2020 59th IEEE Conference on Decision and Control (CDC)*. arXiv:2004.02294. 2020, pp. 6132–6137. DOI: 10.1109/CDC42340.2020.9304010.
9. N. Tupitsa, A. Gasnikov, P. Dvurechensky, and S. Guminov. “Strongly Convex Optimization for the Dual Formulation of Optimal Transport”. In: *Mathematical Optimization Theory and Operations Research*. Ed. by Y. Kochetov, I. Bykadorov, and T. Gruzdeva. Cham: Springer International Publishing, 2020, pp. 192–204. DOI: 10.1007/978-3-030-58657-7\_17.

## 2021

1. A. Agafonov, P. Dvurechensky, G. Scutari, A. Gasnikov, D. Kamzolov, A. Lukashevich, and A. Daneshmand. “An Accelerated Second-Order Method for Distributed Stochastic Optimization”. In: *2021 60th IEEE Conference on Decision and Control (CDC)*. arXiv:2103.14392. 2021, pp. 2407–2413. DOI: 10.1109/CDC45484.2021.9683400.
2. A. Daneshmand, G. Scutari, P. Dvurechensky, and A. Gasnikov. “Newton Method over Networks is Fast up to the Statistical Precision”. In: *Proceedings of the 38th International Conference on Machine Learning*. Ed. by M. Meila and T. Zhang. Vol. 139. Proceedings of Machine Learning Research. PMLR, 18–24 Jul 2021, pp. 2398–2409.
3. P. Dvurechensky, E. Gorbunov, and A. Gasnikov. “An accelerated directional derivative method for smooth stochastic convex optimization”. In: *European Journal of Operational Research* 290.2 (2021), pp. 601–621. DOI: <https://doi.org/10.1016/j.ejor.2020.08.027>.
4. P. Dvurechensky, S. Shtern, and M. Staudigl. “First-Order Methods for Convex Optimization”. In: *EURO Journal on Computational Optimization* 9 (2021). arXiv:2101.00935, p. 100015. DOI: <https://doi.org/10.1016/j.ejco.2021.100015>.
5. A. V. Gasnikov, D. M. Dvinskikh, P. E. Dvurechensky, D. I. Kamzolov, V. V. Matyukhin, D. A. Pasechnyuk, N. K. Tupitsa, and A. V. Chernov. “Accelerated Meta-Algorithm for Convex Optimization Problems”. In: *Computational Mathematics and Mathematical Physics* 61.1 (2021), pp. 17–28. DOI: 10.1134/S096554252101005X.
6. E. Gladin, A. Sadiev, A. Gasnikov, P. Dvurechensky, A. Beznosikov, and M. Alkousa. “Solving Smooth Min-Min and Min-Max Problems by Mixed Oracle Algorithms”. In: *Mathematical Optimization Theory and Operations Research: Recent Trends*. Ed. by A. Strekalovsky, Y. Kochetov, T. Gruzdeva, and A. Orlov. arXiv:2103.00434. Cham: Springer International Publishing, 2021, pp. 19–40.
7. E. Gorbunov, M. Danilova, I. Shibaev, P. Dvurechensky, and A. Gasnikov. “Near-Optimal High Probability Complexity Bounds for Non-Smooth Stochastic Optimization with Heavy-Tailed Noise”. In: *arXiv:2106.05958* (2021).
8. S. Guminov, P. Dvurechensky, N. Tupitsa, and A. Gasnikov. “On a Combination of Alternating Minimization and Nesterov’s Momentum”. In: *Proceedings of the 38th International Conference on Machine Learning*. Ed. by M. Meila and T. Zhang. Vol. 139. Proceedings of Machine Learning Research. arXiv:1906.03622, WIAS Preprint No. 2695. Virtual: PMLR, 18–24 Jul 2021, pp. 3886–3898.
9. A. Ivanova, P. Dvurechensky, A. Gasnikov, and D. Kamzolov. “Composite optimization for the resource allocation problem”. In: *Optimization Methods and Software* 36.4 (2021). arXiv:1810.00595, pp. 720–754. DOI: 10.1080/10556788.2020.1712599.
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12. D. Pasechnyuk, P. Dvurechensky, S. Omelchenko, and A. Gasnikov. “Stochastic Optimization for Dynamic Pricing”. In: *Advances in Optimization and Applications*. Ed. by N. N. Olenov, Y. G. Evtushenko, M. Jaćimović, M. Khachay, and V. Malkova. Cham: Springer International Publishing, 2021, pp. 82–94.

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14. A. Sadiev, A. Beznosikov, P. Dvurechensky, and A. Gasnikov. “Zeroth-Order Algorithms for Smooth Saddle-Point Problems”. In: *Mathematical Optimization Theory and Operations Research: Recent Trends*. Ed. by A. Strekalovsky, Y. Kochetov, T. Gruzdeva, and A. Orlov. arXiv:2009.09908. Cham: Springer International Publishing, 2021, pp. 71–85.
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16. F. Stonyakin, A. Tyurin, A. Gasnikov, P. Dvurechensky, A. Agafonov, D. Dvinskikh, M. Alkousa, D. Pasechnyuk, S. Artamonov, and V. Piskunova. “Inexact model: a framework for optimization and variational inequalities”. In: *Optimization Methods and Software* 36.6 (2021). WIAS Preprint No. 2709, arXiv:2001.09013, arXiv:1902.00990, pp. 1155–1201. DOI: 10.1080/10556788.2021.1924714.
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19. E. A. Vorontsova, A. V. Gasnikov, P. E. Dvurechensky, A. S. Ivanova, and D. A. Pasechnyuk. “Numerical Methods for the Resource Allocation Problem in a Computer Network”. In: *Computational Mathematics and Mathematical Physics* 61.2 (Feb. 2021). arXiv: 1909.13321, pp. 297–328. DOI: 10.1134/S0965542521020135.

## 2022

1. M. Alkousa, A. Gasnikov, P. Dvurechensky, A. Sadiev, and L. Razouk. “An Approach for Non-Convex Uniformly Concave Structured Saddle Point Problem”. In: *arXiv:2202.06376* (2022).
2. A. Beznosikov, P. Dvurechenskii, A. Koloskova, V. Samokhin, S. U. Stich, and A. Gasnikov. “Decentralized Local Stochastic Extra-Gradient for Variational Inequalities”. In: *Advances in Neural Information Processing Systems*. Ed. by S. Koyejo, S. Mohamed, A. Agarwal, D. Belgrave, K. Cho, and A. Oh. Vol. 35. Curran Associates, Inc., 2022, pp. 38116–38133.
3. E. Borodich, V. Tominin, Y. Tominin, D. Kovalev, A. Gasnikov, and P. Dvurechensky. “Accelerated Variance-Reduced Methods for Saddle-Point Problems”. In: *EURO Journal on Computational Optimization* 10 (2022). part of arXiv:2103.09344, p. 100048. DOI: <https://doi.org/10.1016/j.ejco.2022.100048>.
4. S. Chezhegov, A. Novitskii, A. Rogozin, S. Parsegov, P. Dvurechensky, and A. Gasnikov. “A General Framework for Distributed Partitioned Optimization”. In: *IFAC-PapersOnLine* 55.13 (2022). 9th IFAC Conference on Networked Systems NECSYS 2022, pp. 139–144. DOI: <https://doi.org/10.1016/j.ifacol.2022.07.249>.
5. M. Danilova, P. Dvurechensky, A. Gasnikov, E. Gorbunov, S. Guminov, D. Kamzolov, and I. Shibaev. “Recent Theoretical Advances in Non-Convex Optimization”. In: *High-Dimensional Optimization and Probability: With a View Towards Data Science*. Ed. by A. Nikeghbali, P. M. Pardalos, A. M. Raigorodskii, and M. T. Rassias. Cham: Springer International Publishing, 2022, pp. 79–163. DOI: 10.1007/978-3-031-00832-0\_3.
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## 2023

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