

MOHAMMAD S. ALKOUSA (Ph.D. in Mathematics)

Links: [Google Scholar](#), [ResearchGate](#), [arXiv](#)

Scopus Author ID: [57205704002](#), ORCID: [0000-0001-5470-0182](#)

Email: mohammad.math84@gmail.com, mohammad.alkousa@phystech.edu

Last update: 10.12.2022

Education

- **Ph.D. (Mathematics)** 2015—06.2020.
 The dissertation: "[Numerical Methods for Non-Smooth Convex Optimization Problems with Functional Constraints](#)".
 Scientific supervisor: Sc.D. math. Prof. [Alexander V. Gasnikov](#)
 Department of Control/Management and Applied Mathematics, Moscow
 Institute of Physics and Technology (National Research University) [MIPT](#),
 Moscow, Russia.
- **Master (Mathematics)** 2007—2010.
 The dissertation: "[Deep Study in Elliptic Functions Theory](#)".
 Advisor: Assoc. Prof. Mohammad M. Alcheikh. Department of Mathematics,
 Faculty of Science, Damascus University, Syria.
- **Bachelor (Mathematics)** 2002—2006.
 Department of Mathematics, Faculty of Science, Damascus University, Syria.

Publications

Published 2022:

1. F. Stonyakin, A. Gasnikov, P. Dvurechensky, A. Titov, **M. Alkousa**: [Generalized Mirror Prox Algorithm for Monotone Variational Inequalities: Universality and Inexact Oracle](#). Journal of Optimization Theory and Applications, Vol. 194, pp. 988-1013
2. F. S. Stonyakin, A. A. Titov, D. V. Makarenko, **M. S. Alkousa**: [Some Methods for Relatively Strongly Monotone Variational Inequalities](#). Mat. Zametki, 112:6 (2022), 879-894; Math. Notes, 112:6 (2022), 965-977
3. **Alkousa M. S.**, Gasnikov A. V., Dvurechensky P. E., Sadiev A. A., Razouk L. Ya.: [An Approach for Non-Convex Uniformly Concave Structured Saddle Point Problem](#). Computer Research and Modeling, Vol. 14, No. 2, pp. 225-237.
4. Savchuk O. S., Titov A. A., Stonyakin F. S., **Alkousa M. S.**: [Adaptive first-order methods for relatively strongly convex optimization problems](#). Computer Research and Modeling, Vol. 14, No. 2, pp. 445-472.
5. Ablaev S. S., Makarenko D. V., Stonyakin F. S., **Alkousa M. S.**, Baran I. V.: [Subgradient methods for non-smooth optimization problems with some relaxation of sharp minimum](#). Computer Research and Modeling, Vol. 14, No. 2, pp. 473-495.

Published 2021:

6. F. Stonyakin, A. Tyurin, A. Gasnikov, P. Dvurechensky, A. Agafonov, D. Dvinskikh, **M. Alkousa**, D. Pasechnyuk, S. Artamonov, V. Piskunova: *Inexact model: a framework for optimization and variational inequalities*. Optim. Methods and Software, Vol. 36, No. 6, pp. 1155-1201.
7. E. Gladin, **M. Alkousa**, A. Gasnikov: *On solving convex min-min problems with smoothness and strong convexity in one variable group and small dimension of the other*. Automation and Remote Control, Vol. 82, No. 10, pp. 1679–1691.
8. A. Titov, F. Stonyakin, **M. Alkousa**, A. Gasnikov: *Algorithms for solving variational inequalities and saddle point problems with some generalizations of Lipschitz property for operators*. Communications in Computer and Information Science, Vol. 1476, pp. 86-101. Springer, Cham.
9. E. Gladin, A. Sadiev, A. Gasnikov, P. Dvurechensky, A. Beznosikov, **M. Alkousa**: *Solving smooth min-min and min-max problems by mixed oracle algorithms*. Communications in Computer and Information Science, Vol. 1476, pp. 19-40. Springer, Cham.

Published 2020:

10. F. S. Stonyakin, E. A. Vorontsova, **M. S. Alkousa**: *New Version of Mirror Prox for Variational Inequalities with Adaptation to Inexactness*. OPTIMA 2019. Communications in Computer and Information Science, Vol. 1145. Springer, Cham. pp. 427-442.
11. **M. S. Alkousa**: *On Modification of an Adaptive Stochastic Mirror Descent Algorithm for Convex Optimization Problems with Functional Constraints*. Forum for Interdisciplinary Mathematics. Springer, Singapore. pp. 47-63.
12. **M. S. Alkousa**, D. M. Dvinskikh, F. S. Stonyakin, A. V. Gasnikov, D. Kovalev: *Accelerated Methods for Saddle Point Problems*. Comput. Math. and Math. Phys., Vol. 60, No. 11, pp. 1787–1809.
13. A. A. Titov, F. S. Stonyakin, **M. S. Alkousa**, S. S. Ablaev, A. V. Gasnikov: *Analogues of Switching Subgradient Schemes for Relative Lipschitz-Continuous Convex Programming Problems*. Communications in Computer and Information Science, vol 1275. Springer, Cham. pp. 133-149.

Published 2019:

14. A. A. Titov, F. S. Stonyakin, A. V. Gasnikov, **M. S. Alkousa**: *Mirror Descent and Constrained Online Optimization Problems*. Communications in Computer and Information Science, **974**, pp. 64-78.

15. F. S. Stonyakin, **M. S. Alkousa**, A. N. Stepanov, A. A. Titov: *Adaptive Mirror Descent Algorithms for Convex and Strongly Convex Optimization Problems with Functional Constraints*. J. Appl. Ind. Math., **13**(3), pp. 557-574.
16. **M. S. Alkousa**: *On Some Stochastic Mirror Descent Methods for Constrained Online Optimization Problems*. Computer Research and Modeling, **11**(2), pp. 205-217.
17. F. S. Stonyakin, **M. S. Alkousa**, A. A. Titov, V. V. Piskunova: *On Some Methods for Strongly Convex Optimization Problems with One Functional Constraint*. Lecture Notes in Computer Science, Vol. 11548, pp. 82-96.

Published 2018:

18. F. S. Stonyakin, **M. S. Alkousa**, A. N. Stepanov, M. A. Barinov: *Adaptive mirror descent algorithms in convex programming problems with Lipschitz constraints*. Trudy Instituta Matematiki i Mekhaniki URO RAN, **24**(2), pp. 266-279.

Preprints:

19. F. Stonyakin, O. Savchuk, **M. Alkousa**, A. Titov, A. Gasnikov: *Adaptive Algorithms for Relatively Lipschitz Continuous Convex Optimization Problems*. Submitted to the journal *Pure and Applied Functional Analysis*
20. E. Gladin, I. Kuruzov, F. Stonyakin, D. Pasechnyuk, **M. Alkousa**, A. Gasnikov: *Solving strongly convex-concave composite saddle point problems with a small dimension of one of the variables*. Submitted to the journal *Sbornik Mathematics*.
21. S. Bakhurin, R. Hildebrand, **M. Alkousa**, A. Titov: *Optimization in complex spaces with the Mixed Newton Method*. Submitted to the *Journal of Global Optimization*.
22. F. Stonyakin, A. Titov, **M. Alkousa**, O. Savchuk, D. Pasechnyuk: *Gradient-Type Adaptive Methods for Relatively Lipschitz Continuous Convex Optimization Problems*.
23. A. A. Titov, S. S. Ablaev, **M. S. Alkousa**, F. S. Stonyakin, A. V. Gasnikov: *Some Adaptive First-Order Methods for Variational Inequalities with Relatively Strongly Monotone Operators and Generalized Smoothness*. Accepted in OPTIMA-2022
24. I. Kuruzov, **M. Alkousa**, F. Stonyakin, A. Gasnikov: *Gradient-Type Methods for Decentralized Optimization Problems with Polyak-Łojasiewicz Condition over Time-Varying Networks*. Submitted to the journal *Opt. Meth. & Software*
25. I. A. Kuruzov, F. S. Stonyakin, **M. S. Alkousa**: *Gradient-Type Methods for Optimization Problems with Polyak-Łojasiewicz Condition: Early Stopping and Adaptivity to Inexactness Parameter*. Accepted in OPTIMA-2022

Books and mini books:

Employment History

Research Interest and Skills

26. Complex Beauties [2018](#), [2019](#), [2020](#), [2021](#), [2022](#), [2023](#) by Elias Wegert, Gunter Semmler (Technical University Bergakademie Freiberg), Pamela Gorkin and Ulrich Daepf (Bucknell University). A translated from English to Arabic.

27. [Real Infinite Series 1](#). (Book in Arabic), 2021.

- Jan. 2020 —: Junior Researcher in Laboratory of Numerical Methods of Applied Structural Optimization (NuMASO), MIPT, Moscow, Russia.
- Feb. 2019—Dec. 2019: Engineer in Laboratory of Numerical Methods of Applied Structural Optimization (NuMASO), MIPT, Moscow, Russia.
- 2017— 2020: Teacher of mathematics in Iraqi school in Moscow, Russia.
- 2013—2014: Analysis 1, 2 and Complex Analysis 1, Al-Baath University, Faculty of Sciences, department of mathematics. Syria, Homs.
- 2013—2014: Teaching Assistant at Al-Baath University, Faculty of Sciences, department of mathematics. Syria, Homs.
- 2010—2011: Mathematics 2, for first year students in The Syrian International Private University for Science and Technology. Syria, Damascus.
- 2008—2014: Mathematics 1, 2, 3 and 4 for first and second year students in Damascus University, Faculty of Engineering. Syria, Damascus.
- 2006—2014: Teacher of mathematics of the last stage in private schools and educational institutions in Syria, Damascus.

Joint projects:

- 2021. Huawei Russian Research Institute. One project led by Prof. [Alexander Gasnikov](#).
- Jan. 2022 — now: Huawei Russian Research Institute. Two projects led by Prof. [Roland Hildebrand](#).

- **RESEARCH INTEREST:** Different aspects of **mathematical optimization** with applications in Machine Learning, in particular: Convex Optimization, Stochastic Optimization, Variational Inequalities, Saddle Point Problem.
- **Programming languages:** Python (implement methods for mathematical optimization problems and the applications in Machine Learning and Data Analysis), LaTeX.
- **LANGUAGES:** Arabic (Native), Russian (Advanced Knowledge) and English (Advanced Knowledge).