

Erfan Yazdandoost Hamedani

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EDUCATION

Ph.D. in Industrial Engineering (Expected in June 2020)

Aug 2015 – present

Dual title degree for Operations Research

Minor in Statistics

The Pennsylvania State University

University Park, PA

Advisor: Necdet S. Aybat, Ph.D.

B.S. in Mathematics and Applications

Aug 2010– Feb 2015

University of Tehran

Tehran, Iran

RESEARCH INTERESTS

- First-order methods for large-scale problems
- Distributed optimization
- Large-scale saddle point problems
- Machine learning
- Stochastic optimization

PUBLICATIONS

Published Work

- Aybat, N.S., and Yazdandoost Hamedani, E., 2019. A Distributed ADMM-like Method for Resource Sharing over Time-varying Networks. arXiv preprint arXiv:1611.07393. (Forthcoming in SIAM Journal on Optimization)
- Aybat, N.S., and Yazdandoost Hamedani, E., 2016. A Primal-dual Method for Conic Constrained Distributed Optimization Problems. In Advances in Neural Information Processing Systems (NeurIPS) (pp. 5049-5057).
- Yazdandoost Hamedani, E., and Aybat, N.S., 2017. Multi-agent Constrained Optimization of a Strongly Convex Function over Time-varying Directed Networks. 55th Annual Allerton Conference on Communication, Control, and Computing (pp. 518-525). IEEE.
- Yazdandoost Hamedani, E., and Aybat, N.S., 2017. Multi-agent Constrained Optimization of a Strongly Convex Function. In Signal and Information Processing, 2017 IEEE Global Conference on (pp. 558-562). IEEE.
- Aybat, N.S., and Yazdandoost Hamedani, E., 2016. Distributed Primal-dual Method for Multi-agent Sharing Problem with Conic Constraints. In Signals, Systems and Computers, 2016 50th Asilomar Conference on (pp. 777-782). IEEE.

Under Review

- Yazdandoost Hamedani, E., and Aybat, N.S., 2018. A Primal-Dual Algorithm for General Convex-Concave Saddle Point Problems. arXiv preprint arXiv:1803.01401. (2nd round at SIAM Journal on Optimization)
- Yazdandoost Hamedani, E., and Aybat, N.S., 2019. A Decentralized Primal-dual Method for Constrained Minimization of a Strongly Convex Function. arXiv preprint arXiv:1706.07907. (1st round at IEEE Transaction on Automatic Control)
- Jalilzadeh, A., Yazdandoost Hamedani, E., Aybat, N.S. and Shanbhag, U.V., 2019. A Doubly-Randomized Block-Coordinate Primal-Dual Method for Large-scale Saddle Point Problems. arXiv preprint arXiv:1907.03886. (1st round at Operations Research)
- Yazdandoost Hamedani, E., Jalilzadeh, A., Aybat, N.S., and Shanbhag, U.V., 2018. Iteration Complexity of Stochastic Primal-Dual Methods for Non-bilinear Saddle Point Problems. arXiv preprint arXiv:1806.04118. (To be submitted to SIAM Journal on Optimization)

DISSERTATION

- Ph.D. thesis: Primal-dual Methods for Saddle-point and Conic Constrained Distributed Optimization Problems
 - **Distributed optimization:** Developed and analyzed first-order algorithms for solving conic constrained multi-agent consensus optimization and resource sharing problems over both static and time-varying (possibly directed) communication networks where only local communications are allowed. The proposed algorithms have agent-specific step-size rules with optimal convergence rate guarantees.
 - **Large scale saddle-point problems:** Developed accelerated first-order primal-dual algorithms for solving convex-concave saddle-point problems with applications in machine learning. Improved the efficiency and robustness of the proposed methods for large-scale stochastic convex-concave saddle-point problems via exploiting randomized block coordinate structures and incorporating variance reduction techniques.
 - **Dissipativity theory for optimization:** Adapted the control theory tools to efficiently construct Lyapunov functions in order to analyze the convergence characteristics of first-order primal-dual methods.
- B.S. Project: Inverse Programming and its Application in Network Flow Problems
 - Studied an inverse optimization model for network flow problems – to analyze the minimal required change in the cost function to make a given feasible solution optimal.

PRESENTED WORK

- Yazdandoost Hamedani, E., and Aybat, N.S., 2019. A Distributed ADMM-like Method For Resource Sharing Over Time-varying Networks, INFORMS Annual Meeting 2019, Seattle, WA.
- Yazdandoost Hamedani, E., Jalilzadeh, A., Aybat, N.S., and Shanbhag, U.V., 2019. Iteration Complexity of Randomized Primal-dual Methods for Stochastic Convex-concave Saddle Point Problems, INFORMS Annual Meeting 2019, Seattle, WA.
- Yazdandoost Hamedani, E., Jalilzadeh, A., Aybat, N.S., and Shanbhag, U.V., 2019. A Doubly-Randomized Block-Coordinate Primal-Dual Method for Large-scale Convex-Concave Saddle Point Problems: Acceleration via Variance-Reduction, Sixth International Conference on Continuous Optimization, Berlin, Germany.
- Yazdandoost Hamedani, E., Jalilzadeh, A., Aybat, N.S., and Shanbhag, U.V., 2018. Primal-Dual Methods for Convex-Concave Saddle Point Problems, 23rd International Symposium on Mathematical Programming, Bordeaux, France.
- Yazdandoost Hamedani, E., and Aybat, N.S., 2018. On Primal-dual Methods for Saddle Point Problems, INFORMS Annual Meeting 2018, Phoenix, AZ.
- Yazdandoost Hamedani, E., Aybat, N.S., 2017. On Multi-agent Constrained Optimization of a Strongly Convex Function over Directed Networks, INFORMS Annual Meeting 2017, Houston, TX.
- Yazdandoost Hamedani, E., and Aybat, N.S., 2016. On Distributed ADMM-like Methods for Cooperative Multi-agent Optimization over Conic Constraints, INFORMS Annual Meeting 2016, Nashville, TN.

ACADEMIC SERVICES

Referee Experience

- Reviewer of two papers in IEEE Transactions on Automatic Control (TAC), 2018 - 2019
- Reviewer of four papers in International Conference on Machine Learning (ICML), 2019
- Reviewer of three papers in annual conference on Neural Information Processing System (NeurIPS), 2018
- Reviewer of two papers in annual conference on Neural Information Processing System (NeurIPS), 2016

Membership

- Institute of Operations Research and Management Science (INFORMS), 2016 - present
 - Optimization Society, Computing Society, and Decision Analysis Society

TEACHING INTERESTS

- Linear, Nonlinear, Convex, and Stochastic optimization (Graduate and Undergraduate)
- Probability and Stochastic processes (Graduate and Undergraduate)
- Statistics and Data mining (Graduate and Undergraduate)

TEACHING AND MENTORING EXPERIENCE

- Department of Industrial and Manufacturing Engineering, Penn State University *Summer 2019*
- Mentoring an intern for the project titled "Dissipativity Theory for Primal-dual Methods"
- Department of Industrial and Manufacturing Engineering, Penn State University *Fall 2018 and 2019*
- Teaching assistant, Deterministic Models in Operations Research (IE 405 undergraduate level)
- Department of Industrial and Manufacturing Engineering, Penn State University *Spring 2017 and 2018*
- Teaching assistant, Advanced Linear Programming (IE 597 graduate level)
- Department of Industrial and Manufacturing Engineering, Penn State University *Spring 2017 and 2018*
- Teaching assistant, Convex Optimization (IE 525 graduate level)
- Department of Mathematics, Penn State University *Aug - Sept 2014*
- Co-instructor with full responsibility, Linear Programming (MATH 484 undergraduate level)
- Department of Mathematics, University of Tehran *Spring 2014*
- Teaching Assistant with recitation class, Linear Optimization II (undergraduate level)

PROFESSIONAL EXPERIENCE

- Research Assistant** *Aug 2015 - Present*
- Department of Industrial and Manufacturing Engineering, Penn State University
- Internship** *Jul - Sept 2014*
- Department of Mathematics, Penn State University
Project titled "Transportation problems"

HONORS AND AWARDS

- Offered admission to the M.S. program as an outstanding undergraduate student and exempted from taking the entrance exam, University of Tehran, 2015.
- Rank 1st (gold medal) in Iranian Operations Research Student Competition, 2013 and 2014.

SKILLS AND COURSES

- **Optimization and Operations Research:** Advanced linear and Nonlinear programming, Convex optimization, Stochastic Optimization, Dynamic programming, Discrete event system simulation
- **Statistics and Machine Learning:** Data mining, Applied stochastic process, Topics in stochastic process, Regression methods, Participating in machine learning summer school at Lehigh University (2018)
- **Programming Languages and Solvers:** MATLAB, Python, OpenMPI, Gurobi, CPLEX, MOSEK, CVX