Shixuan Zhang

Contact

Position: Graduate Research Associate, Georgia Institute of Technology
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Education

- Ph.D in Operations Research, Georgia Institute of Technology, Atlanta, Georgia — 2017–Present
  Advisor: Xu Andy Sun
  Expected Graduation Date: August 2022
- B. S. in Mathematics and Physics, Tsinghua University, Beijing, China — 2013-2017

Publications and Preprints

1. Zhang, Shixuan, and Xu Andy Sun. "On Distributionally Robust Multistage Convex Optimization: New Algorithms and Complexity Analysis." arXiv preprint arXiv:2010.06759 (2020, Submitted to *Mathematics of Operations Research*).

2. Zhang, Shixuan, and Xu Andy Sun. "Stochastic Dual Dynamic Programming for Multistage Stochastic Mixed-Integer Nonlinear Optimization." arXiv preprint arXiv:1912.13278 (2019, Submitted to *Mathematical Programming*), **Honorable Mention** for IOS Student Paper Prize 2021.

3. Zhang, Shixuan, Sheng Liu, Tianhu Deng, and Zuo-Jun Max Shen. "Transient-State Natural Gas Transmission in Gunbarrel Pipeline Networks." INFORMS Journal on Computing (2020).

4. Deng, Tianhu, Yong Liang, Shixuan Zhang, Jingze Ren, and Shuyi Zheng. "A Dynamic Programming Approach to Power Consumption Minimization in Gunbarrel Natural Gas Networks with Nonidentical Compressor Units." INFORMS Journal on Computing 31, no. 3 (2019): 593-611.

Research and Industrial Projects

- **Sum of Squares and Quadratically Constrained Programs** — 2020–Present
  Working paper, Advisor: Prof. Andy Sun

  - Study on the exactness of sum-of-squares relaxation of quadratically constrained programs
  - Application in energy systems including power grids and natural gas networks

- **Grid Optimization Competition (Challenges 1 & 2)** — 2018–Present
  Team Leader: Prof. Andy Sun
  Teammates: Prof. Santanu Dey, Amin Gholami, Kaizhao Sun
  ★ Our team placed **third** worldwide in Challenge 1 in 2020

  - Based on real-world power grid operational data and sponsored by ARPA-E with multimillion prize
  - Progress on fast algorithms for security-constrained alternating current optimal power flow problems

Teaching Experience

- Teaching Assistant for Deterministic Optimization (ISYE6669) — Fall 2017
- Teaching Assistant for Deterministic Optimization Online Course (ISYE6669OAN) — Spring & Fall 2018

Invited Talks

1. Generalized Conjugacy Method for Nonconvex Stochastic Optimization in Power Systems, INFORMS Annual Meeting 2020
2. Stochastic Dual Dynamic Programming Algorithm for Multistage Stochastic Mixed-integer Nonlinear Optimization, MIP Workshop 2020
3. Stochastic Dual Dynamic Programming Algorithm for Nonconvex Multistage Optimization Problems, INFORMS Annual Meeting 2019
4. New Algorithms for Solving the Natural Gas Transient Scheduling Problem, IISE Annual Meeting 2019
5. A Minor Perspective on Rank Constrained Optimization, INFORMS Annual Meeting 2018

Academic Services

1. Reviewer for *Mathematical Programming* and *Mathematical Programming Computation*
2. Reviewer for *SIAM Journal on Optimization*
3. Reviewer for *Operations Research* and *INFORMS Journal on Computing*
4. Reviewer for *IEEE Transactions on Power Systems* and *Transactions on Control of Network Systems*