Tianyun Tang

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Institute of Operations Research and Analytics
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Appointments

Research Fellow | Advisor: Prof. Kim-Chuan Toh 2024-present
Institute of Operations Research and Analytics, National University of Singapore, Singapore

Education

Ph.D. in Mathematics | Advisor: Prof. Kim-Chuan Toh 2020-2024
Department of Mathematics, National University of Singapore, Singapore

Bachelor of Science in Mathematics and Applied Mathematics 2016-2020
School of Mathematical Sciences, University of Science and Technology of China, Hefei, China

Research interests

- Matrix optimization
- Riemannian optimization
- Scientific computing
- Combinatorics

Publications

- **Monochromatic subgraphs in iterated triangulations**
(with Jie Ma and Xingxing Yu) Electronic Journal of Combinatorics 27(4) (2020), P4.18.
- **Minimizing cycles in tournaments and normalized q-norms**
(with Jie Ma) Combinatorial Theory 2(3) (2022), #6.
- **A feasible method for solving an SDP relaxation of the quadratic knapsack problem**
(with Kim-Chuan Toh) Mathematics of Operations Research, 49(1) (2024), 19-39.
- **Solving graph equipartition SDPs on an algebraic variety**
(with Kim-Chuan Toh) Mathematical Programming, 204(1) (2024), 299-347.
- **Self-adaptive ADMM for semi-strongly convex problems**
(with Kim-Chuan Toh) Mathematical Programming Computation, 16(1) (2024), 113-150.
- **A Riemannian dimension-reduced second order method with application to sensor network localization**
(with Kim-Chuan Toh, Nachuan Xiao and Yinyu Ye) SIAM Journal on Scientific Computing, 46(3) (2024), A2025-A2046.
- **A feasible method for general convex low-rank SDP problems**
(with Kim-Chuan Toh) SIAM Journal on Optimization, 34(3) (2024), 2169-2200.

- **Accelerating nuclear-norm regularized low-rank matrix optimization through Burer-Monteiro decomposition**
(with Ching-Pei Lee, Ling Liang and Kim-Chuan Toh), Journal of Machine Learning Research, 25(379) (2024), 1-52.
- **Optimization over convex polyhedra via Hadamard parametrizations**
(with Kim-Chuan Toh) Mathematical Programming, accepted.

Preprints

- **Exploring chordal sparsity in semidefinite programming with sparse plus low-rank data matrices**
(with Kim-Chuan Toh), submitted.
- **A Bregman ADMM for Bethe variational problem**
(with Yuehaw Khoo and Kim-Chuan Toh), submitted.
- **A Low-rank Augmented Lagrangian Method for Doubly Nonnegative Relaxations of Mixed-binary Quadratic Programs**
(with Di Hou and Kim-Chuan Toh), submitted.

Teaching

- MA1521 Calculus for Computing, semester 2 AY2021/22
- DSA3102 Essential Data Analytics Tools: Convex Optimisation, semester 1, AY 2022/23
- MA3252 Linear and Network Optimization, semester 2, AY 2022/23
- DSA2102 Essential Data Analytics Tools: Numerical Computation, semester 1, AY 2023/2024

Referee for journals

- Operations Research
- Mathematical Programming
- SIAM Journal on Optimization
- IEEE Transactions on Signal Processing
- Journal of Optimization Theory and its Applications
- Journal of Global Optimization

Talks and presentations

- A feasible method for general convex low-rank SDP problems, the 25th International Symposium on Mathematical Programming, Montreal, Canada
- A feasible method for general convex low-rank SDP problems, 2024 INFORMS Optimization Society Conference, Rice University, Houston, Texas, U.S.
- A feasible method for solving an SDP relaxation of the quadratic knapsack problem, 2023 INFORMS Annual Meeting, Phoenix, Arizona, U.S.
- Solving graph equipartition SDPs on an algebraic variety, The 10th International Congress on Industrial and Applied Mathematics, Waseda University, Tokyo, Japan.

- Solving graph equipartition SDPs on an algebraic variety, 2023 SIAM Conference on Optimization, The Sheraton Grand Seattle, Seattle, Washington, U.S.

Recognitions

- PhD Conference Award 2023
- Best Graduate Researcher Award 2023
- Graduate Tutor Commendation letters
- SIAM Student Chapter Certificate 2024

Skills

MATLAB, Python, C, Latex