

Nachuan Xiao

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Google Scholar

Education

Academy of Mathematics and Systems Sciences

Chinese Academy of Sciences, Beijing, China

Ph.D. in Computational Mathematics

Advisor : Prof. Ya-xiang Yuan

September 2016 – June 2021

School of Mathematical Science

Fudan University, Shanghai, China

B.S. in Mathematics

September 2012 – June 2016

Academic Experience

Institute of Operations Research and Analytics (IORA)

National University of Singapore, Singapore

Research Fellow

Advisor : Prof. Kim-Chuan Toh

August 2021 – present

Research Interests

- Optimization over Riemannian manifolds
- Nonsmooth optimization
- Constrained optimization

My research interests include numerical methods for optimization problems on Riemannian manifolds arisen from statistics and machine learning problems. I am also interested in designing algorithms for minimizing nonsmooth functions with constraints, especially those problems related to deep learning.

Publications

1. **Nachuan Xiao**, Xin Liu and Ya-xiang Yuan, Exact Penalty Function for $\ell_{2,1}$ Norm Minimization over the Stiefel Manifold, SIAM Journal on Optimization, 2021, 31(4): 3097-3126. (link)
2. **Nachuan Xiao**, Xin Liu, and Ya-xiang Yuan, A class of smooth exact penalty function methods for optimization problems with orthogonality constraints. Optimization Methods and Software, 37:4, 1205-1241. (link)
3. **Nachuan Xiao**, Xin Liu and Kim-Chuan Toh, Dissolving Constraints for Riemannian Optimization, Mathematics of Operations Research (in print). (link)
4. **Nachuan Xiao**, Xin Liu and Ya-xiang Yuan, A Penalty-free Infeasible Approach for a Class of Nonsmooth Optimization Problems over the Stiefel Manifold, (under review). (link)
5. **Nachuan Xiao** and Xin Liu, Solving Optimization Problems over the Stiefel Manifold by Smooth Exact Penalty Function, (under review). (link)
6. Xiaoyin Hu, **Nachuan Xiao**, Xin Liu and Kim-Chuan Toh, A Constraint Dissolving Approach for Nonsmooth Optimization over the Stiefel Manifold, (under review). (link)
7. Xiaoyin Hu, **Nachuan Xiao**, Xin Liu and Kim-Chuan Toh, An Improved Unconstrained Approach for Bilevel Optimization, (under review). (link)
8. **Nachuan Xiao**, Xiaoyin Hu, Xin Liu and Kim-Chuan Toh, CDOpt: A Python Package for a Class of Riemannian Optimization, (under review). (link)
9. **Nachuan Xiao**, Xin Liu and Kim-Chuan Toh, A Partial Exact Penalty Function Approach for Constrained Optimization, (under review). (link)
10. Tianyun Tang, Kim-Chuan Toh, **Nachuan Xiao**, Yinyu Ye, A Riemannian Dimension-Reduced Second Order Method with Application to Sensor Network Localization, (under review).

Presentations

- The 8th Youth Symposium on Scientific and Engineering Computing of Scientific Computing Forum, 2022.12, Beijing, China.
- The 17th Annual Meeting of China Society for Industrial and Applied Mathematics, 2019.09, Foshan, China.
- The 12th International Conference on Numerical Optimization and Numerical Linear Algebra, 2019.04, Shangrao, China.

Honors & Awards

- Second Prize in Tianchi Competition on Algorithm Design for Fabric Packing Problems (2/832)
- Excellence Award in Alibaba Global Mathematics Competition, 2018

Skills

- **Programming:** Matlab, Python, \LaTeX