Yan Yang

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🎓 Education

Sep 2022 – Current 🔖 **Ph.D. in computational mathematics**

University of Chinese Academy of Sciences, and Academy of Mathematics and Systems Science, CAS, Beijing, China

Supervisor: Prof. Ya-xiang Yuan

Sep 2018 – Jun 2022 🔖 **B.S. in mathematics and applied mathematics**

University of Chinese Academy of Sciences, Beijing, China

💡 Research interests

> Low-rank optimization
> Riemannian optimization

> Bilevel optimization
> Reinforcement learning

My research interests focus on the geometry and numerical methods for optimization problems involving low-rank matrices or tensors, which incorporate the ideas from Riemannian optimization. I am also interested in bilevel optimization and reinforcement learning problems stemming from various machine learning and engineering applications.

📄 Publications & preprints

1. **Yan Yang**, Bin Gao, Ya-xiang Yuan. A space-decoupling framework for optimization on bounded-rank matrices with orthogonally invariant constraints. Mathematical Programming, (2026), accepted. (link, code)

2. **Yan Yang**, Bin Gao, Ya-xiang Yuan. Variational analysis of determinantal varieties. arXiv:2511.22613, (2025). (link)

3. **Yan Yang**, Bin Gao, Ya-xiang Yuan. LancBiO: dynamic Lanczos-aided bilevel optimization via Krylov subspace. The 13th International Conference on Learning Representations (ICLR 2025), (2025). (link, code)

4. **Yan Yang**, Bin Gao, Ya-xiang Yuan. Bilevel reinforcement learning via the development of hyper-gradient without lower-level convexity. Proceedings of The 28th International Conference on Artificial Intelligence and Statistics (AISTATS 2025), PMLR 258 (2025), 47804788. (link, code)

🏆 Grants & awards

2025 – 2027	The CAST's Young Talents Cultivation Program for Doctoral Students
2025	Hua Luogeng Scholarship at Academy of Mathematics and Systems Science, CAS
2025	SIAM Student Certificate of Recognition
2022	Outstanding Graduation Student of Beijing
2019 – 2022	First-class Academic Scholarship (top 5%)
2021	National Scholarship for Undergraduates (top 3%)

🖥 Presentations

❯ A space-decoupling framework for optimization on bounded-rank matrices with orthogonally invariant constraints

2025.11.19 | The Eighth Peking University Symposium for Top Doctoral Students in Computational and Applied Mathematics, Beijing, China

❯ Hyper-gradient in bilevel optimization: efficient computation by Krylov Subspace and enhanced investigation in reinforcement learning

2025.10.23 | The Twenty-Third Annual Conference of China Society for Industrial and Applied Mathematics, Changsha, China (Poster at CSIAM 2025)

❯ Bilevel reinforcement learning via the development of hyper-gradient without lower-level convexity

2025.08.10 | The China Conference on Scientific Machine Learning, Beijing, China (CSML2025)

❯ LancBiO: dynamic Lanczos-aided bilevel optimization via Krylov subspace

2025.04.24 | The Thirteenth International Conference on Learning Representations Singapore (Poster at ICLR 2025)

⌨ Skills

Programming Languages : Python, Matlab, LaTeX, Linux, Shell, C/C++
Machine Learning : Pytorch

♥ Service

Sep 2023 – Sep 2024 🔖 President of Chinese Academy of Sciences SIAM Student Chapter