Yingzhu Liu

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RESEARCH INTEREST

• Saddle Flow Dynamics: Algorithm Design & Analysis

• Contraction Theory for Dynamical Systems

• Optimization Theory of Reinforcement Learning

EDUCATION

• **Peking University** *Sep. 2022 - Jun. 2027 (expected)*
Ph.D. in Mechanics (Dynamical Systems and Control) Beijing, China
◦ Advisor: Prof. Zhongkui Li and Prof. Pengcheng You

• **Peking University** *Sep. 2018 - Jun. 2022*
B.S. in Theoretical and Applied Mechanics Beijing, China
◦ Advisor: Prof. Zhongkui Li
◦ Thesis: Robust performance analysis of distributed optimization algorithms

PUBLICATIONS & PREPRINTS

Preprints

1. P. You, **Y. Liu**, and E. Mallada, A Unified Analysis of Saddle Flow Dynamics: Stability and Algorithm Design, 2024, submitted. [arXiv]

Conference

1. **Y. Liu**, E. Mallada, Z. Li, and P. You, "Accelerated Saddle Flow Dynamics for Bilinearly Coupled Minimax Problems," in 63rd IEEE Conference on Decision and Control (CDC), 2024. [PDF]

RESEARCH PROJECTS

• **Saddle Flow Dynamics: Stability and Algorithm Design** *Feb. 2023 - Present*
Doctoral Research Assistant, advised by Prof. Pengcheng You & Prof. Zhongkui Li Beijing, China
◦ Featured a unified analysis and provided convergence conditions based on properties of the objective function.
◦ Systematically inspired novel algorithm designs and/or explained existing algorithms from a new perspective.

• **Distributed Optimization Algorithms: Robust Performance Analysis** *Sep. 2021 - Nov. 2022*
Research Intern, advised by Prof. Zhongkui Li Beijing, China
◦ Viewed the iterative algorithm as a discrete-time controller, and the function to be optimized as an uncertain plant.
◦ Analyzed the internal stability and input-output stability from a frequency-domain perspective.

TEACHING EXPERIENCE

• **Introduction to Probability and Mathematical Statistics** *Beijing, China*
Teaching Assistant at Yuanpei College, Peking University *Fall 2024*

• **Theoretical Mechanics** *Beijing, China*
Teaching Assistant at Yuanpei College, Peking University *Fall 2023*

SKILLS & ACTIVITIES

• **Programming Skills:** Python, MATLAB, Mathematica

• **Languages:** Chinese (Native), English (Proficient)

• **Activities:** Photography, Squash

HONORS AND AWARDS

• The Student Travel and Workshop Support for CDC, 2024.

• Outstanding Research Award, Peking University, 2024.

• Outstanding Undergraduate Thesis/Design from Beijing Universities, 2022. Top 1% of students.

• Outstanding Undergraduate Graduate, Peking University, 2022.

• Merit Student, Peking University, 2019.

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