Yue GUO

CONTACT

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GitHub https://github.com/GUOYUE-Cynthia
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EDUCATION

2021 - **PhD in Mathematics:** *National University of Singapore, Singapore.*
Supervisor: Qianxiao Li (https://blog.nus.edu.sg/qianxiaoli)

2019 - 2020 **MSc in Mathematics:** *National University of Singapore, Singapore.*

2015 - 2019 **BSc in Pure and Applied Mathematics:** *Jilin University, China.*

EXPERIENCE

2020 - 2021 **Research Assistant** | *Department of Mathematics, National University of Singapore*

- Developed and maintained codebase for OnsagerNet using TensorFlow 2, combining model reduction approaches.
- Built predictive models for weather forecasting, compared with baseline models.
- Conducted data analysis on large-scale datasets to evaluate model performance and refine hyperparameters.

PROJECTS

2021-2022 **Learning-Based ODE Solver** | *Python (TensorFlow 2)*

- Developed a machine learning-based ordinary differential equation solver (Runge-Kutta scheme) that outperforms classical methods in accuracy.
- Integrated TensorFlow models to adapt solver parameters based on input data.

2021-2023 **Parametric Koopman Decompositions for Dynamic Systems with Control** | *Python (PyTorch)*

- Implemented Koopman-type decompositions for dynamic systems with static or time-varying parameters.
- Used neural networks to construct invariant subspaces and parametric families of projected Koopman operators.
- Achieved improved predictive accuracy on forward predictions and increased efficiency in solving control problems over baseline models for high-dimensional, non-linear systems.

PUBLICATIONS

2024 **Learning Parametric Koopman Decompositions for Prediction and Control.** *SIAM Journal on Applied Dynamical Systems (accepted).* https://arxiv.org/pdf/2310.01124.pdf

2024 **A Recursively Recurrent Neural Network (R2N2) Architecture for Learning Iterative Algorithms.** *SIAM Journal on Scientific Computing.* https://doi.org/10.1137/22M1535310

2022 **Personalized Algorithm Generation: A Case Study in Learning ODE Integrators.** *SIAM Journal on Scientific Computing.* https://doi.org/10.1137/21M1418629

COMPETITIONS

2023 **APAC Datathon Spring 2023** — First Place

Project: Mathematical Modelling for Traffic Police Resource Allocation

- Created data-driven strategies for optimizing police resource allocation, resulting in measurable efficiency improvements.
- Utilized Python for data cleaning, mathematical modeling, and visualization.

TALKS & PRESENTATIONS

2024 The 14th AIMS Conference, co-hosted by the American Institute of Mathematical Sciences (AIMS) and NYU Abu Dhabi (NYUAD), Abu Dhabi, United Arab Emirates.

2023 The 13th SIAM Student Chapter Symposium, National University of Singapore, Singapore.

2023 SINFRA workshop 2023, hosted by the international IPAL laboratory (CNRS, NUS, A*STAR, Univ Toulouse 3, Toulouse INP, CYU), Toulouse, France.

SKILLS

Programming: Python (NumPy, Pandas, Scikit-learn, PyTorch, TensorFlow 2), Matlab, Git

Techniques: Machine Learning, Deep Learning, Data Analysis, Dynamical Systems

Languages: Mandarin Chinese (native), English (professional)

AWARDS

2023 First Place, APAC Datathon Spring 2023.

2021-2025 Research Scholarship, National University of Singapore, under National Research Foundaion (NRF) Fellowship.

Last updated: Feb 2025