Yihan Guo

Education

University of Chicago 09/2024-Present
M.S. in Computational and Applied Mathematics · GPA: 3.87/4.00

Fudan University 09/2020-06/2024
B.S. in Mathematics and Applied Mathematics · GPA: 3.81/4.00

Publications & Preprints

- Eigen, singular, cosine-sine, and Autonne–Tagaki vectors distributions of random matrix ensembles.

Research Experience

Research Assistant UChicago
Advisor: Prof. Lek-Heng Lim

- Shown that some of the best-known matrix decompositions of some of the best-known random matrix ensembles give us the unique G-invariant uniform distributions on some of the best-known manifolds. The eigenvectors distributions of the Gaussian, Laguerre, and Jacobi ensembles are all given by the uniform distribution on the complete flag manifold. The singular vectors distributions of Ginibre ensembles are given by the uniform distribution on a product of the complete flag manifold with a Stiefel manifold. Circular ensembles split into two types: The cosine-sine vectors distributions of circular real, unitary, and quaternionic ensembles are given by the uniform distributions on products of a (partial) flag manifold with copies of the orthogonal, unitary, or compact symplectic groups. The Autonne–Tagaki vectors distributions of circular orthogonal, Lagrangian, and symplectic ensembles are given by the uniform distributions on Lagrangian Grassmannians.

Undergraduate Researcher Fudan University
Mentor: Prof. Yingzhou Li

- Worked on near-term quantum algorithms for finding ground states of quantum Hamiltonians, such as quantum imaginary time evolution and quantum Lanczos.

Teaching

Teaching Assistant, FINM 34800: Modern Applied Optimization UChicago
Duties: Creating problems for homework and tests, Grading, Holding office hours 2 hours/week.

Honors

Ministry of Education (China) National Scholarship, 2021
The most competitive academic performance-based undergraduate honor in China.

Selected Coursework

- Graduate: random matrix theory, measure-theoretic probability sequence, PDEs, theoretical computer science: analysis of Boolean functions.

- Undergraduate: functional analysis, differential geometry, algebraic topology.

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