Rui Gong

Department of Combinatorics and Optimization, Faculty of Mathematics, University of Waterloo
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RESEARCH INTERESTS

Continuous Optimization, Convex Optimization, Semidefinite Optimization and their applications to other areas.

EDUCATION

University of Waterloo — Waterloo, Ontario, Canada
M.Math. in Combinatorics & Optimization — 2021.09-2023.04(expected)

- GPA: 92.67/100
- Passed C&O PhD first stage comprehensive exams: Continuous Optimization, Graph Theory

University of Waterloo — Waterloo, Ontario, Canada
B.Math. Triple Major in Mathematical Finance, Mathematical Optimization, Statistics — 2017.09-2021.08

- Dean's Honour List
- GPA: 87.96. Major GPA: 88.71

RESEARCH

Rank decomposition, maximizing sparsity in the decomposition of positive semidefinite matrices (In Progress), M. Math. Thesis, advised by Levent Tuncel.
Generalized classical minimum trace factor analysis (MTFA). Generalized the diagonal perturbation matrix to a tridiagonal matrix with regularization terms. Proved that such problems have unique optimal solutions under some regularization conditions. Currently working on analyzing the algorithms for this problem and its application to graph theory.

Approximate minimum rank matrix completion (In Progress), with Alexander Shapiro, Levent Tuncel.
Developing algebraic characterizations for the uniqueness of optimal solutions for approximate minimum rank matrix completion. Analyzing how the perturbation on the given matrix would affect the uniqueness and rank of the optimal solutions.

SCHOLARSHIPS & AWARDS

Math Domestic Graduate Student Award	2022-2023
Sinclair Graduate Scholarship	2022.09-2022.12
C & O Graduate Award	2022.01-2022.04
Sinclair Graduate Scholarship	2022.01-2022.04
President's Scholarship of Uwaterloo	2017

TALKS

Speaker: *Convex Optimization, Factor Analysis and Realizability of a Subspace*, Graduate Research Seminar, Department of Combinatorics & Optimization, Faculty of Mathematics, University of Waterloo. 2022.04.11

WORKSHOP

Attendee: 24th Midwest Optimization Meeting & Workshop on Large Scale Optimization and Applications, University of Waterloo. 2022.10.28-2022.10.29

RESEARCH FUNDING

Received: Graduate Research Studentship, Department of Combinatorics & Optimization, Faculty of Mathematics, University of Waterloo. 2021-2023

Applying: Natural Sciences & Engineering Research Council (NSERC) Doctoral Scholarships, NSERC. 2023-2025

WORK EXPERIENCE

Intact Financial Corporation Toronto, Canada

Actuarial Analyst of Ontario PL Pricing 2020.01 - 2020.04

Extracted and manipulated databases to respond to internal inquiries by SAS. Generated earning and loss reports weekly and monthly by Excel and SAS. Analyzed correctness of rates for insurance premium algorithm with R.

Validus Research Inc. Waterloo, Canada

Quality Assurance Student Engineer 2018.09 - 2018.12

Created automation tests and check the quality of the programs by Selenium Python.

TEACHING

Teaching Assistant University of Waterloo

- Undergraduate course: Portfolio Optimization (CO372) 2021.09-2022.04; 2022.09-2022.12
  Holding office hours, marking assignments and exams.
- Graduate course: Semidefinite Programming (CO471/671) 2022.05-2022.08
  Marking assignments.

COURSES

Have taken 13 graduate-level courses with a grade average of 94.46:
Continuous Optimization Convex Optimization and Analysis Semidefinite Optimization Combinatorial Optimization Optimization for Data Science Stochastic Processes Graph Theory Lebesgue Integration and Fourier Analysis Measure and Integration Statistical Learning - Function Estimation Statistical Learning - Classification Quantitative Enterprise Risk Management Mathematics of Financial Markets

TECHNICAL STRENGTHS

Language Proficiency: Native Chinese Speaker, Proficient in English
Programming Languages: Python, Matlab, R, LaTeX