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MOHAMMADHOSSEIN MOHAMMADISIAHROUDI

EDUCATION

Ph.D. of Industrial & System Engineering at Lehigh University, Bethlehem, PA, USA, (2019-now)

Total GPA: 3.9/4 **Advisor**: Prof. Tamás Terlaky

Ph.D. Thesis: Quantum Computing and Optimization Methods

M.Sc. of Industrial Engineering at Sharif University of Technology, Tehran, Iran, (2017-2019)

Total GPA: 18.74/20 (4/4) **Advisor**: Prof. Kourosh Eshghi

M.Sc. Thesis: Solving Multi-Objective Integer Optimization Problems by Benders Decomposition Method

B.Sc. of Industrial Engineering at Iran University of Science and Technology, Tehran, Iran, (2011-2016)

Total GPA: 17.03/20 (3.67/4) **B.Sc. Thesis**: Locating Vaccination Centers in Developing Countries

FIELDS OF INTEREST

- Mathematical Optimization
- Quantum Computing
- Operations Research
- Applications of Optimization in:
  - Healthcare Systems
  - Supply Chain Management
  - Machine Learning
  - Finance

CURRENT RESEARCH

Research assistant in Quantum Computing and Optimization Lab at Lehigh University (2019-now)

- Quantum Interior Point Method and Quantum Linear Algebra
- Robust Treatment Planning for IMPT
- Conic Optimization

HONORS

Van Hoesen Family Best Publication Award 2023

Industrial and System Engineering PhD Student of the Year Award 2022

Ranked 5 among 64 classmates in M.Sc. Industrial Engineering class of 2017

Ranked 13 in nationwide university entrance exam for M.Sc. degree – Industrial Engineering 2017

Ranked in top 15 percent among 80 classmates in B.Sc. Industrial Engineering class of 2011

Ranked in top 1 percent in nationwide university entrance exam for B.Sc. degree with 284000 participants in 2011

FELLOWSHIP AND GRANT AWARDS

Gottshall Fellowship from the Department of Industrial & System Engineering at Lehigh University 2019

NSF Student Travel Grant Award, The 7th ACM/IEEE Symposium on Edge Computing, SEC 2022

2022 Rossin Professional Development Program Grant

PAPERS

Mohammadisiahroudi M, Fakhimi R, Terlaky T, (2023). "Efficient Use of Quantum Linear System Algorithms (QLSA) in Interior Point Methods for Solving Linear Optimization Problems". (arXiv, under revision for JOTA)

Wu Z, **Mohammadisiahroudi M**, Augustino B, Yang X, Terlaky T, (2023). "An Inexact Feasible Quantum Interior Point Method for Linearly Constrained Quadratic Optimization". *Entropy*.; 25(2):330. https://doi.org/10.3390/e25020330

Abbasian M, Sazvar Z, **Mohammadisiahroudi M,** (2022). "A hybrid optimization method to design a sustainable resilient supply chain in a perishable food industry". Environ Sci Pollut Res Int. doi: 10.1007/s11356-022-22115-8.

Mohammadisiahroudi M, Fakhimi R, Augustino B, Terlaky T, (2023). "Generating Linear, Semidefinite, and Second-order Cone Optimization Problems for Numerical Experiments". (arXiv and submitted to OMS)

Sampourmahani P, **Mohammadisiahroudi M,** Terlaky T, (2023). "On semidefinite representations of second-order conic optimization problems". (arXiv and submitted to COT)

Mohammadisiahroudi M, Fakhimi R, Wu Z, Terlaky T, (2022). "An Inexact Feasible Interior Point Method for Linear Optimization with High Adaptability to Quantum Computers". (Tech Report)

Mohammadisiahroudi M, Augustino B, Fakhimi R, Nannicini G, Terlaky T, (2023). "Accurately Solving Linear Systems with Quantum Oracles". (Tech Report)

Mohammadisiahroudi M, Terlaky T, (2023). "Quantum IPMs for Linear Optimization". (Encyclopedia of Optimization)

Mohammadisiahroudi M, Augustino B, Fakhimi R, Terlaky T, (2022). "Quantum Interior Point Methods with Exponentially Improved Dependence on Precision for SDO". (Under Preparation)

Augustino B, Terlaky T, **Mohammadisiahroudi M,** Zuluaga L, (2022). "Quantum Interior Point Methods for Second Order Cone Optimization Problems". (Under Prepration)

CONFERENCE PAPERS

Mohammadisiahroudi M, Wu Z, Augustino B, Terlaky T, Carr A. Quantum-enhanced Regression Analysis Using State-of-the-art QLSAs and QIPMs. In2022 IEEE/ACM 7th Symposium on Edge Computing (SEC) 2022 Dec 1 (pp. 375-380). IEEE Computer Society.

Siahroudi, M. H. M., Fatahi Valilai, O., (2018). "Integration of Cloud Manufacturing and Cloud Remanufacturing". International Conference on Computers & Industrial Engineering (CIE). Auckland, New Zealand. (Scopus Indexed)

Mohammadisiahroudi M, Najafi, M., & Pourmohamadreza, N., (2018). "A model for locating vaccination centers in rural areas". The 11th International Conference of Iranian Operations Research Society.

Abbasian, M., Haji, A., & **Mohammadisiahroudi M,** (2018). "Study and analysis of pistachio supply chain in Iran by business process management". 4th International Conference on Industrial and System Engineering.

Abbasian, M., Haji, A., & **Mohammadisiahroudi M,** (2018). "A Multi-objective Model for Designing a Sustainable Supply Chain in Iran Pistachio Industry and Analyzing Agricultural Reform Projects". 15th Iran International Industrial Engineering Conference.

Heidari, N., Jamili, A., & **Mohammadisiahroudi M,** (2018). "A Multi-objective model for designing a network of preventive healthcare centers under uncertainty". 15th Iran International Industrial Engineering Conference.

CONFERENCE PRESENTATIONS

Mohammadisiahroudi M, Augustino. B., Fakhimi, R., Terlaky, T., Nannicini, G., (2022). "Accurately Solving Linear Systems with Quantum Oracles". APS March Meeting 2023.

Mohammadisiahroudi M, Augustino. B., Fakhimi, R., Terlaky, T., Nannicini, G., (2022). "Accurately Solving Linear Systems with Quantum Oracles". 2022 Mid-Atlantic Numerical Analysis Day.

Mohammadisiahroudi M, Augustino. B., Fakhimi, R., Terlaky, T., Nannicini, G., (2022). "Accurately Solving Linear Systems with Quantum Oracles". 2022 INFORMS Annual Meeting.

Mohammadisiahroudi M, Augustino. B., Fakhimi, R., Terlaky, T., Nannicini, G., (2022). "Iterative Refinement to Improve Precision and Complexity of Quantum Interior Point Methods". The seventh International Conference on Continuous Optimization (ICCOPT).

Mohammadisiahroudi M, Augustino. B., Fakhimi, R., Terlaky, T., Nannicini, G., (2022). "Iterative Refinement to Improve Dependence on Precision for Quantum Interior Point Methods". INFORMS Computing Society Conference.

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "An Inexact Infeasible Quantum Interior Point Method for Linear Optimization". 2021 INFORMS Annual Meeting.

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "Efficient Use of the Quantum Linear System Algorithms in Interior Point Methods for Linear Optimization". Modeling and Optimization: Theory and Applications (MOPTA).

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "An Inexact Feasible Interior Point Method for Linear Optimization". The 22nd Conference of the International Federation of Operational Research Societies.

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "Efficient Use of Quantum Linear System Algorithms (QLSA) in Interior Point Methods for Solving Linear Optimization Problems". SIAM Conference on Optimization.

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "An Inexact Feasible Interior Point Method for Linear Optimization with High Adaptability to Quantum Computers". 31st European Conference on Operational Research.

Mohammadisiahroudi M, Fakhimi, R., Terlaky, T., (2021). "Efficient Use of Quantum Linear System Algorithms in Interior Point Methods for Solving Linear Optimization Problems". Sixth International Conference for Young Quantum Information Scientists.

Mohammadisiahroudi M, Terlaky, T., (2020). "Efficient use of the Quantum Linear System Algorithm (QLSA) in Interior Point methods for solving Linear Optimization problems". 2020 INFORMS Annual Meeting.

POSTER

Mohammadisiahroudi M, Augustino. B., O'Neill. M., Terlaky, T., (2021). "Application of Quantum Linear System Algorithms for Machine Learning". TRIPODS+X workshop on Machine Learning & Supply Chain Management.

CERTIFICATES

"Teacher Development Program, Level 2", Lehigh University, USA, 2023.

"Teacher Development Program, Level 1", Lehigh University, USA, 2022.

"Quantum Computing for Optimization'', Lehigh University, USA, 2020. (Instructor: Prof. Giacomo Nannicini)

"Technical Analysis", Khane Sarmaye Community, Iran, Tehran, 2013.

"Comfar 3", Arisa Professional Consulting & Training, Iran, Tehran, 2016.

"Professional Excel (VBA & Macro)", Toesse Institute, Iran, Tehran, 2017.

SKILLS

LANGUAGE

Persian (Native), English (Fluent), Azerbaijani (Intermediate), Turkish (Intermediate), Arabic (Basic)

COMPUTER

Programming: Python, C, C++, Julia, Matlab, Visual Basic, R.

Quantum: IBM QISKIT.

Optimization: GAMS, AMPL, Gurobi, CPLEX, LINGO, MOSEK, SeDuMi, CVX, JuMP.

Analytics: SQL, Spark, Python, Rapidminer, Tableau.

Engineering: Comfar III, Vensim, Microsoft Project, Minitab, Expert Choice, Bizagi.

Radiotherapy: Varian Eclipse, MatRad.

Other: Microsoft Office (Professional), Microsoft Visio, Photoshop, LaTeX.

BUSINESS

Business Process Management, Business Model Designing, Business Analytics.

FINANCE

Technical & Fundamental Analysis

TEACHING EXPERIENCE

Teaching, ISE 426 Optimization Models and Applications, Department of Industrial Engineering, Lehigh University, Spring 2023.

Teaching, Linear Algebra, Department of Industrial Engineering, Lehigh University, Bootcamp 2022.

Teaching Assistant, Financial Optimization, Department of Industrial Engineering, Lehigh University, Prof. Luis Zuluaga - Spring2022.

Teaching Assistant, Intro to OR, Department of Industrial Engineering, Lehigh University, Prof. Tamas Terlaky - Fall 2021.

Teaching Assistant, Operation Research 1, Department of Industrial Engineering, Sharif University of Technology, Prof. Kourosh Eshghi- Spring & Fall 2018, Spring 2019.

Teaching Assistant, Operation Research 2, Department of Industrial Engineering, Sharif University of Technology, Prof. Mohammad Modarres- Fall 2018 & Spring 2019.

Teaching Assistant, Computer Integrated Manufacturing, Department of Industrial Engineering, Sharif University of Technology, Prof. Omid Fatahi Valilai – Fall 2018.

Teaching, Mathematics, Hemmat Selective High school, Tehran, Iran, 2011.

Tutoring, Mathematics, 2011-2014.

MAJOR COURSES

ISE Department at Lehigh University:

Convex Analysis, Intro to Optimization, Conic Optimization, Discrete Optimization, Nonlinear Optimization, Computational methods in Optimization, Optimization Algorithms and Software, Mining Large Datasets, Optimization in Machin Learning, Applied OR.

Math Department at Lehigh University:

Real Analysis, Random Process & Application.

CSE Department at Lehigh University:

Iterative Methods for Large, Sparse Linear Systems, Advance Algorithm (Audited).

IE department at Sharif University of Technology:

Integer Programming, Combinatorial Optimization, Multi-Criteria Decision Making, Financial Engineering, Pricing and Revenue Management, Optimization in Healthcare, Queueing Systems, Data-driven Decision Making (Audited).

IE Department at Iran University of Science and Technology:

Linear Algebra, Operations Research 1 & 2, Decision Making Analysis, Production & Inventory Control, Production Planning, System Analysis.

SERVICES

President of Lehigh University INFORMS Student Chapter (2021-2022): The winner of INFORMS Magna Cum Laude Award 2022.

President of Lehigh University Iranian Students Association (2020-2021)

Representative of Ph.D. students in student council of ISE department (2021-2023)

Volunteer for organizing ICCOPT Conference, Lehigh University (July 2022)

Reviewer for Journals:

- INFROMS Journal on Computing
- Journal of Optimization Theory and Applications
- Central European Journal of Operations Research
- Engineering Applications of Artificial Intelligence
- Periodica Mathematica Hungarica
- IEEE Power Engineering Letters

Section chair in conference: INFORMS 2022

Member of INFORMS (2020-now), SIAM (2021-now), IEEE (2022-now), and APS (2022-now)

HOBBY

Playing Piano & Setar (an Iranian Musical Instrument), Reading Books (Philosophy & Psychology)

REFERENCES

Dr. Tamás Terlaky Email: tat208@lehigh.edu
Professor of Industrial & System Engineering Department (Lehigh University)

Dr. Frank E. Curtis Email: fec309@lehigh.edu
Professor of Industrial & System Engineering Department (Lehigh University)

Dr. Luis F. Zuluaga Email: luis.zuluaga@lehigh.edu
Associate Professor of Industrial & System Engineering Department (Lehigh University)

Dr. Arielle Carr Email: arg318@lehigh.edu
Assistant Professor of Computer Science & Engineering Department (Lehigh University)

Dr. Giacomo Nannicini Email: g.nannicini@usc.edu
Associate Professor of Daniel J. Epstein department of Industrial & Systems Engineering (University of Southern California)

Dr. Kourosh Eshghi Email: Eshghi@sharif.edu
Professor of Industrial Engineering Department (Sharif University of Technology)