NIMA DOLATABADI*

* Also publishes as Reza Hosseini Dolatabadi.

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EDUCATION

B.Sc In Computer Engineering, Minor in Mathematics November 2020 - September 2025
Sharif University of Technology, Department of Computer Engineering

- **Thesis:** Constructing minimum-cost Markov chains with an iterative algorithm
- **Supervisor:** Mohammad Ali Abaam

Diploma in mathematics and physics August 2020
Allameh Helli 1 Highschool

PUBLICATIONS

- M. J. Golin, R. H. Dolatabadi, A. Zamani - Better Algorithms for Constructing Minimum Cost Markov Chains and AIFV Codes. In *2024 IEEE International Symposium on Information Theory (ISIT)*
- M. J. Golin, R. H. Dolatabadi, A. Zamani - A (Weakly) Polynomial Algorithm for AIVF Coding. In *2024 IEEE International Symposium on Information Theory (ISIT)*
- S. Akbari, R. H. Dolatabadi, M. Jamaali, S. Klavžar, N. Movarraei - On the Δ-edge stability number of graphs. In *European Journal of Combinatorics, vol. 127, p. 104167, 2025.*
- H. Esfandiari, M. Ghaempanah R. H. Dolatabadi, S. Hossein Ghorban - What is the chance of being so unfair? In *In Companion Proceedings of the ACM on Web Conference 2025.*

RESEARCH INTERESTS

Algorithms, Computational Complexity, Coding Theory, Combinatorics, Graph Theory, Algebraic Combinatorics

WORK EXPERIENCE

Research Assistant

- **Research with Prof. Yi-Jun Chang** Feb. 2026 – present
  National University of Singapore (NUS) Singapore

  Working as a Research Assistant at the School of Computing on problems in *distributed graph algorithms*, focusing on the design and analysis of efficient graph coloring algorithms in distributed models of computation.

- **Summer Internship with Prof. Mordecai J. Golin** Jul. 2023 – Sep. 2023
  Hong Kong University of Science and Technology (HKUST) Hong Kong

  Completed a two-month internship, during which we solved an optimization problem on min-cost Markov chains. Submitted two papers to ISIT using geometric and linear-algebraic techniques. Internship certificate can be viewed here.

Teaching Mathematics

- **Member of Scientific Committee** 2020 - 2025
  Young Scholars Club *Iran, Tehran*

  Chaired the Exam Preparation Committee for the final round of the 2024 National Math Olympiad and led the Number Theory group for the 2023 final round and the IMO Team Selection Test (2023–2024). Headed the Combinatorics group for the second round of the National Math Olympiad (2022–2023) and served as the Head of the Number Theory group for the Iranian IMO Training Camp (2022–2024). Designed and delivered advanced lectures on Linear Algebra, Combinatorics, and Algebraic Number Theory for Olympiad gold medalists and high school students. Proposed original problems in Number Theory, Geometry, and Combinatorics.

- **Mathematics Instructor** 2020 - 2025
  SAMPAD highschools (Part-time, Olympiad Training) *Iran, Tehran*

  Taught selected modules in number theory and combinatorics and assisted in preparing students for mathematics olympiad competitions.

RESEARCH EXPERIENCE

Remote Research [1]

- **Research with Prof. Sepehr Assadi** (University of Waterloo, Canada) **(Sept. 2025 - Feb. 2026):** Investigating catalytic space computation via the model of *Catalytic Turing Machines*, which augment logarithmic workspace with an auxiliary catalytic memory that must be restored at the end of computation. This model defines the complexity class CL. Our work shows that the *Maximal Independent Set (MIS)* problem is in CL, which is an interesting result for understanding its relationship with other space-bounded complexity classes.
- **Research with Prof. Aaron Bernstein** (NYU, New York, Unites States) **(Jul. 2024–present):** Working on a streaming-algorithm problem. We obtained a $(\frac{2}{3} - \epsilon)$-approximation for the Maximum Weighted Matching problem in the random-streaming model, which is the best known approximation. I derived the algorithm by modifying an existing algorithm that achieves the same ratio in the unweighted setting. We analyzed the modified algorithm and proved it outputs a high-probability approximation. The result was independently discovered by another group, so we did not publish our work.
- **Research with Prof. Saieed Akbari** (Sharif University), **Prof. Sandy Klavžar** (Ljubljana, Slovenia), and **Dr. Jamaali (May. 2023–Mar. 2025):** Studied structural properties of the minimum number of edges that must be removed to reduce a graph's maximum degree. We discovered a strong connection between this parameter and the edge-chromatic index. The results were published in the *European Journal of Combinatorics* (Q1).
- **Research with Dr. Hossein Esfandiari** (Google, London) **(Feb. 2023–Mar. 2025):** Worked on a project on *Fairness in Ranking*, introducing a new stochastic perspective and algorithms for both verifying fairness and producing fair rankings. I implemented the algorithms, proved their correctness, and contributed to extensive experimental results. Published in WWW 2024.
- **Research with Prof. Prahladh Harsha** (TIFR, Mumbai, India) **(Aug. 2024–Mar. 2025):** Working on algebraic coding theory, focusing on efficient list-decodability of Reed–Solomon codes beyond the Johnson radius. We aim to achieve tighter analyses of multiplicity-code list-decoding algorithms to obtain improved list-size bounds, and to generalize the GM–MDS theorem.

HONORS

- Ranked 3rd nationwide in the National Master's Entrance Examination (Konkur) in Pure Mathematics 2025
- Won the second prize of the First Undergraduate Research Seminar in Graph Theory at Sharif 2024
- Bronze medal of International Mathematical Olympiad (IMO) 2020
- Bronze medal of Romanian Masters of Mathematics 2020

[1] All projects were conducted without external funding.

- Silver medal of Asian Pacific Mathematical Olympiad 2020
- Silver medal of ELMO [2] 2020
- Silver medal of European Mathematical Cup [2] 2019
- Gold medal of Iranian National Mathematics Olympiad [3] 2019

EXTRA TEACHING EXPERIENCES

University Teaching Assistantships
Computer Engineering Department of Sharif University of Technology *Iran, Tehran*

- Theory of Languages and Automata September 2023
- Linear Algebra (Head-TA) January 2023
- Linear Algebra (Head-TA) September 2022
- Probability and Statistics (Head of Exercise) September 2022

RELEVANT COURSES

- Combinatorics And Its Applications - 19.7
- Graph Theory I (Graduate) - 18.5
- Mathematical Analysis - 20
- General Topology - 20
- Advanced Topics In Algorithms (Graduate) - 19.2
- Computational Geometry (Graduate) - 20
- Fourier Analysis - 19.5
- Game Theory - 20

SKILLS

Technical Skills	Python, C#, ASP.Net Core, Java, Oracle, SQL, C, LaTeX
Languages	Persian (native), English (fluent)
Art Skills	Playing Santour (an Iranian instrument)

[2] During COVID, they didn't provide us certificates.
[3] The National Committee did not provide us an English certificate.