

# Danial Ramezani

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## Contact Information

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## Research Interests

- Operations Research
  - Optimization
  - Scheduling
  - Supply Chain and Logistics
  - Healthcare
  - Decision-Making Under Uncertainty
  - Data Mining and Machine Learning
  - Explainable AI
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## Education

- **Kharazmi University** **Iran-Tehran**  
M.Sc. Industrial Engineering – Systems Engineering **2022-2024**
    - ❖ **Thesis:** It comprises two research projects: 1. Fast-converging and extensive search strategies for evolutionary algorithms in large-scale portfolio optimization under cardinality constraint. 2. A novel robust mixed integer linear programming model for index tracking problem under no rebalancing: Heuristic optimization approach.
    - ❖ **GPA:** (18.91/20) – (4/4)
  - **Iran University of Science and Technology** **Iran-Tehran**  
B.Sc. Industrial Engineering **2016-2021**
    - ❖ **Thesis:** A new user-friendly decision-making website for multi-criteria decision-making for experts and regular users
    - ❖ **GPA:** (15.97/20) – (3.28/4) Last two years: (17.41) – (3.651)
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## Publications

- ❖ **Research Papers**
  - ❖ **Ramezani Danial;** *Abouei Ardakan Mostafa*, “Fast-converging and extensive search strategies for evolutionary algorithms in large-scale portfolio optimization under cardinality constraint”, *Optimization and Engineering* – Under Review,  
In this paper, strengthening strategies are presented for multi-objective evolutionary algorithms that can provide a faster convergence rate and extensive search ability in the portfolio optimization problem under cardinality constraints. To implement those

features, a unique solution representation, a novel operator, and new repair mechanisms are introduced for solving the aforementioned problem in which lower and upper limits are set on the number of assets in the portfolio. For this purpose, new mating strategies along with the aforesaid package are implemented on a multi-objective evolutionary algorithm (NSGA-II) to solve the problem. The customized algorithm is subsequently tested against traditional NSGA-II using well-known market indices in the benchmark. Results indicate that the proposed strategy not only provides better approximations for identical numbers of iterations but converges faster as well at no loss of performance with increasing number of assets in the market.

- ❖ **Ramezani Danial.**; *Abouei Ardakan Mostafa.*; *Mohammadreza Dehghani Ahmadabad,*” A novel robust mixed integer linear programming model for index tracking problem under no rebalancing: Heuristic optimization approach”, *Annals of Operations Research – Under Review*.

In this paper, a new robust mixed integer linear programming model that performs better in out-of-sample data compared to state-of-the-art formulations is proposed for the index tracking problem. Furthermore, due to the NP-hardness of the problem, a new heuristic algorithm is developed to solve the proposed formulation that is capable of converging to the global optima in small size and outperforms commercial solvers in larger size in less computation time.

## Academic Projects

- ❖ **Master’s Thesis**, In the first part of my thesis novel fast-converging approaches are proposed for evolutionary algorithms and implemented on a Non-Dominated Sorting Genetic Algorithm (NSGA-II) for the portfolio optimization problem that can approximate better results compared to regular NSGA-II in a shorter time (in python). In the second part, a novel robust mixed integer programming model along with a new hybrid algorithm is proposed that can achieve lower tracking error in out-of-sample compared to state-of-the-art formulations. Master’s Thesis, Dr. Abouei Ardakan Mostafa, Mohammadreza Dehghani Ahmadabad, 2024
- ❖ **Survey of application of Blockchain technology in agri-food supply chain**, The aim of the study was to determine the current state of the adoption of Blockchain technology in agri-food supply-chain and examining the opportunities and challenges of the aforesaid technology in supply chain by reviewing recent peer-reviewed papers, Project of the Course “Supply chain and logistics”, Dr. A. H. Gholam Saryazdi, 2023
- ❖ **Application of clustering in multi-objective Pareto Fronts**, I analyzed the clustering of solutions found in Pareto Fronts in multi-objective algorithms (I coded an NSGA-II algorithm for mean-variance portfolio optimization) by Using clustering algorithms (such as K-means, Fuzzy C-means) (Implemented in python), Project of the Course “Data mining: applications and algorithms”, Dr. M. V. Sebt, 2023
- ❖ **Coding and analyzing the optimization model of vehicle routing problem with drones and time windows**, Purpose of the project was to code the mathematical model of the paper “Vehicle routing problems with drones considering time windows” with GAMS and analyze the model for improvement and mistakes, Project of the Course “Integer programming”, Dr. A. Mozdgir, 2023

- ❖ **Solving reliability optimization problem with water cycle algorithm and simulated annealing**, I Coded the water cycle algorithm and simulated annealing algorithm in Python for solving the reliability optimization problem, Project of the Course “combinatorial optimization”, Dr. M. Abouei, 2022
- ❖ **Review of mining queuing system in Bitcoin’s Blockchain**, Analyzing queuing system in Bitcoin’s Blockchain, Project of the Course” Queueing theory”, Dr. A. Mirzazadeh, 2022
- ❖ **A new user-friendly decision-making website for experts and regular users**, A new user-friendly website for multi-criteria decision-making methods (SAW-TOPSIS-ARAS-WASPAS-VIKOR) with different settings for usage of academic users and regular users currently deployed at “[de-decision](#)”, (Implemented in React JS, JavaScript), Bachelor’s Thesis, Dr. A. Makui, 2021
- ❖ **Designing the industrial unit for the production of jet fan tunnel**, The Aim of the project was to plan a factory that will produce fans for tunnels from scratch, Project of the course “Planning industrial units”, Dr. M. S. Jabalameli, 2020
- ❖ **Investigating the effects of inappropriate use of cell phones on the human body**, The Goal of the study was to review the effect of the usage of mobile phones on the eyes, neck, etc. by reviewing recently published peer-reviewed journals, Project of the Course” Ergonomics”, Dr. R. Ghousi, 2020
- ❖ **Comparison of Business Process Management Software(BPMS)**, The Purpose of the project was to compare the most common BPMS, Project of the Course “System analysis”, Dr. M. S. Pishvaei, 2020
- ❖ **Study of Iran’s economy**, I studied Iran’s economy from GDP growth, infrastructures, inflation, population crisis, and challenges by reviewing publicly available data published by the Iranian government from, Project of the Course “Macroeconomics”, Dr. S. Mirzamohammadi, 2019

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#### Self-motivated Projects and Research

- ❖ **Generating data for drug response dataset using Variational Autoencoder (VAE)**, A VAE is employed to generate new data for the Drug Classification dataset using PyTorch, 2025.
- ❖ **Decoding risk factors in heart failure prediction: a neural network approach with SHAP analysis**, This project employs a neural network model (in PyTorch on Heart failure clinical records dataset) trained on clinical data to predict heart failure outcomes, utilizing SHAP to elucidate the contribution and impact of each factor, 2025.
- ❖ **Investigating the impact of optimizers on neural network performance in heart disease prediction**, This project analyzes the effects of common deep learning optimizers on neural network performance in predicting heart diseases, using UCI Heart Disease Data, 2025.
- ❖ **Predicting diabetes using neural networks**, The project uses a neural network to predict the likelihood of diabetes in patients, utilizing the Pima Indians Diabetes dataset, and is implemented with the PyTorch library, 2025.
- ❖ **Artificial neural network for trading using technical analysis in the crypto market**, An artificial neural network is used to predict the direction of a possible trade. Features of this dataset are technical analysis attributes of 60,000 records of large-cap cryptocurrencies, 2024.
- ❖ **Application of autoencoders in image processing**, Investigating how different autoencoders (denoising, compressing, generating, convolution) can be used for handwritten digit recognition using the MNIST dataset, Tensorflow, 2024

- ❖ **Framework for statistical arbitrage**, A framework for trading cointegrated pairs in the crypto market using different time-series and machine-learning models (Implemented in Python), 2024
- ❖ **Optimization model for pairs trading**, A mathematical formulation for finding cointegrated pairs with different sizes of Long-short portfolios alongside their optimal weight, 2024
- ❖ **Application of reinforcement learning in trading**, Reinforcement learning model for trading in cryptocurrency market using TensorFlow and Open AI gym libraries, 2024
- ❖ **A machine learning framework for technical trading**, A Random Forest model is implemented on customized data (using technical indicators alongside pattern recognition and economic indicators for features and custom target values) to predict whether long or short trade will be successful or not. (Average score of 75%), 2024
- ❖ **Optimization model for football fantasy**, An optimization model to find the best players to be in the starting eleven constrained to budget, formation, etc. that are expected to achieve maximum points (Implemented in Python using Pyomo package), 2023
- ❖ **Market price prediction**, The Price of the next period of the asset is predicted using the last two months' data with LSTM, (Implemented in Python using Tensorflow library), 2022
- ❖ **Ranking web-developing programming languages with MADM methods**, The Aim was to determine the best programming languages for new learners in the web-developing industry based on some criteria, 2021

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## Related Professional Experiences

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| <ul style="list-style-type: none"> <li>❖ <b>Research Assistant</b> <ul style="list-style-type: none"> <li>❖ Assistant to Dr. M. Abouei researching optimization problems in financial markets and serving as a co-reviewer for academic papers</li> </ul> </li> </ul>  | <b>Iran-Tehran</b><br><b>2022-Present</b> |
| <ul style="list-style-type: none"> <li>❖ <b>Teaching Assistant – Simulation and modeling</b> <ul style="list-style-type: none"> <li>❖ Assistant to Dr. H. Izadbakhsh in a simulation and modeling course for a semester; coding examples, teaching Python, and organizing projects.</li> <li>❖ GitHub repository related to the course:<br/> <a href="https://github.com/danialramezani/Simulation-via-python">https://github.com/danialramezani/Simulation-via-python</a> </li> </ul> </li> </ul> | <b>Iran-Tehran</b><br><b>2023</b>         |
| <ul style="list-style-type: none"> <li>❖ <b>Quality control engineer– Intern</b> <ul style="list-style-type: none"> <li>❖ Three months of work as a quality control engineer at the ZAM-ZAM corporates.</li> </ul> </li> </ul>   | <b>Iran-Rasht</b><br><b>2021</b>          |

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## Skills

- ❖ **Programming Skills**  
Python, GAMS, JavaScript
- ❖ **Software and Libraries**  
Pyomo (optimization), Tensorflow, Pytorch, Scikit-learn (machine learning, deep learning, and data mining), LaTeX, Microsoft Office, Weka, Minitab, Bizagi, Adobe Photoshop, ReactJS (front-end web development)

❖ **Other skills**

Academic Writing, Time-series Forecasting, Developing Algorithms/Heuristics, Statistical Arbitrage, Feature Engineering, Analyzing stock (Fundamental, Technical), Problem-solving

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**Languages**

- ❖ **English: Fluent (IELTS 7.5: Listening=8, Reading=7, Writing=7, Speaking=7.5)** **2025**

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**Related Certificates**

- ❖ **Game Theory-Stanford University** **2022**

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**Relevant Coursework**

**Graduate courses:**

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|---|-------------------------------------|---|
| ❖ <b>Combinatorial Optimization</b>       | ❖ <b>Stochastic Processes</b>       | ❖ <b>Integer Programming</b>                      |
| ❖ <b>Queue Theory</b>                     | ❖ <b>Supply Chain and Logistics</b> | ❖ <b>Data Mining: Applications and Algorithms</b> |
| ❖ <b>Scheduling: Production Processes</b> | ❖ <b>Experiment Design</b>          |   |

**Undergraduate courses:**

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|--------------------------------------|--|---|
| ❖ <b>Engineering Economics</b>       | ❖ <b>Microeconomics</b>                    | ❖ <b>Macroeconomics</b>                 |
| ❖ <b>Linear Algebra</b>              | ❖ <b>Operations Research 1</b>             | ❖ <b>Probability Theory</b>             |
| ❖ <b>Statistics</b>                  | ❖ <b>Operations Research 2</b>             | ❖ <b>Accounting and Finance</b>         |
| ❖ <b>Statistical Quality Control</b> | ❖ <b>Financial Engineering</b>             | ❖ <b>Inventory Control</b>              |
| ❖ <b>System Analysis</b>             | ❖ <b>Mathematical Decision-Making</b>      | ❖ <b>Reliability and Maintenance</b>    |
| ❖ <b>Simulation</b>                  | ❖ <b>Production Planning</b>               | ❖ <b>Planning Industrial Units</b>      |
| ❖ <b>Ergonomics</b>                  | ❖ <b>Management of Information systems</b> | ❖ <b>Marketing and entrepreneurship</b> |
| ❖ <b>Project Management</b>          | ❖ <b>Management</b>                        | ❖ <b>Work Study</b>                     |

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References Are Available upon Request.