



Mohammadreza Gilak

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Personal Profile

MSc student in Control Engineering at Sharif University of Technology (Rank 1, GPA 19.24/20) with research and development experience in nonlinear control, optimal control, model predictive control, state estimation, and legged robotic systems. Research interests include advanced control design, optimization-based control, learning-based control, and estimation for nonlinear dynamical systems. Developed open-source control software with 3500+ installations through PyPI and MATLAB File Exchange.

Education

M.Sc. in Electrical Engineering – Control Engineering

2024 – Present

Sharif University of Technology, ranked 1st in Iran according to [QS](#)

Tehran, Iran

- GPA: 19.24/20.00

- Graduate Thesis: Control Design and Implementation for a Three-Joint Leg Mechanism

- Nonlinear Control, Optimal Control, Adaptive Control, Model-Predictive Control, System Identification

B.Sc. in Electrical Engineering – Control Engineering

2019 – 2024

Sharif University of Technology, ranked 1st in Iran according to [QS](#)

Tehran, Iran

Publications

- Mohammadreza Gilak**, Mehdi Zarei, et al., *An Energy Conservation Approach to Variable Stiffness Single Leg Jumping*, 34th International Conference on Electrical Engineering (ICEE), 2026 ([accepted](#))
- Mehdi Zarei, **Mohammadreza Gilak**, et al., *Quadrupedal Locomotion: An IMM-KF with PDF Truncation for Physically Consistent Contact and Slip Detection*, IEEE Robotics and Automation Letters, 2026 ([under review](#))
- Mohammadreza Gilak**, Behzad Ahi, *Generalized Internal Stability of Reduced-order ADRC for the Class of Uncertain High-order LTI Systems*, International Journal of Systems Science, 2026 ([under review](#))
- Mohammadreza Gilak**, Raziye Mehraban, et al., *Model-Free Inverse Optimal Control Based on Dynamic Linearization*, 11th International Conference on Control, Instrumentation and Automation (ICCIA), 2025, DOI: [10.1109/ICCIA69223.2025.11285957](#)

Experiences

Robotics Engineer

Sept 2025 – Present

Sharif University of Technology

Tehran, Iran

- Contributed to the development of a quadruped robot platform from the ground up.
- Implemented MPC, whole-body control, state estimation and contact detection in Mujoco and Isaac Sim.
- Developed an IMM-KF-based contact detection framework and validated it on both simulation and a physical 3-DoF leg platform.

Teaching Assistant & Lab Instructor

Sept 2024 – Present

Sharif University of Technology

Tehran, Iran

- Designed assignments and course project for Optimal Control and Industrial Control courses.
- Sole instructor for Linear Control Lab and Simulation in Control Lab, assessing 30+ students.
- Assisted the professor with grading for Linear Control Systems and Linear Algebra courses.

Graduate Research Assistant & Lab Coordinator

Jan 2025 – Present

Sensor Fusion and Advanced Control Lab, Sharif University of Technology

Tehran, Iran

- Mentored graduate and undergraduate students while gaining hands-on experience with humanoid robotics, mobile robotics, and path-planning projects.
- Managed the lab's GitHub organization, equipment inventory, software access, and student onboarding.

Research Interests

Legged Robotics
Learning-Based Control

State Estimation
Differential Geometry

Sensor Fusion
Model Predictive Control

Projects

Manipulator Simulator

2025 – Present

MATLAB

[GitHub](#)

- An object-oriented framework for simulating manipulators with kinematics using DH parameters, dynamics using the Newtonian method, and including gravity compensation, PD, and Slotine controllers.

Active Disturbance Rejection Controller (ADRC)

2024 – Present

Python, MATLAB, Simulink, C++

[GitHub](#) | [PyPI](#) | [MATLAB Exchange](#)

- A cross-platform ADRC library, including tracking differentiators and extended-state observers.

Symbolic Optimal Control Problem Solver

2024 – Present

MATLAB, Python

[GitHub](#) | [PyPI](#) | [MATLAB Exchange](#)

- A symbolic framework for solving nonlinear optimal control problems using gradient-based optimization.

Model Predictive Controller (MPC)

2025 – Present

MATLAB

[GitHub](#) | [MATLAB Exchange](#)

- Dynamic Matrix Control (DMC) and Extended Predictive Functional Control (EPFC) for a general nonlinear system.

Achievements

Awarded Student Grant for Elite Students in Master's degree, Sharif University of Technology	2026
Best Conference Paper , ICCIA 2025 ¹	2025
Tuition waiver for Master's degree, Sharif University of Technology	2024
Ranked 15/10,000 in the Iranian University Entrance Exam for Master's, Iran	2024
Tuition waiver for Bachelor's degree, Sharif University of Technology	2019
Ranked 69/164,000 in the Iranian University Entrance Exam, Iran	2019

Skills

Programming	MATLAB, Python, C++
Simulation & Modeling	Simulink, Simscape, Gazebo, MuJoCo
Robotics	ROS2, Arduino, SOLIDWORKS
Tools	Shell, Git, Docker, PyPI Packaging, L ^A T _E X

Languages

English	Professional proficiency (C2) (TOEFL 6/6 , 118/120)
Spanish	Working proficiency (B2)
German	Beginner proficiency (A2)
Persian (Farsi)	Native proficiency

Interests

Chess: Started from age 15. Competed in the University's tournament.

Poetry: Interest in classical Persian literature and participation in university literary society events.

Hiking: Long-distance and endurance hiking.

¹11th International Conference on Control, Instrumentation and Automation