# Ali BaniAsad
## Curriculum Vitae

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## EDUCATION

**M.S.** Aerospace Engineering      Sep. 2022 – Apr. 2025
*Sharif University of Technology*

**B.S.** Aerospace Engineering      Sep. 2017 – May 2022
*Sharif University of Technology*
Upper-division GPA: 3.72/4.00

## RESEARCH INTERESTS

- Reinforcement Learning
- Multi-Agent Systems
- Game Theory
- Robotics
- Automatic Control
- Embedded ML

## PUBLICATIONS

### Journal Papers

- A. Sharifi, **A. BaniAsad**, and S. Mozafari, "Applied an in-motion transfer alignment approach during global positioning system outages utilizing a recurrent neural network algorithm," *Engineering Applications of Artificial Intelligence*, vol. 157, pp. 111167, 2025, doi: 10.1016/j.engappai.2025.111167.

- **A. BaniAsad**, et al., "Attitude Control of a 3-DoF Quadrotor Platform Using a Linear Quadratic Integral Differential Game Approach," *ISA Transactions*, vol. 148, pp. 515-527, 2024, doi: 10.1016/j.isatra.2024.03.005.

### Conference Papers

- **A. BaniAsad** and H. Nobahari, "Robust DDPG Reinforcement Learning Differential Game Guidance in Low-Thrust, Multi-Body Dynamical Environments," in *Proc. of 23rd International Conference of Iranian Aerospace Society*, 2025 (Proceedings entry) (Project Repo (Code, Report, and Presentation) on GitHub).

- M. Amirpour, **A. BaniAsad**, and H. Nobahari, "Reinforcement Learning-Based Controller Design for a Suspended Ball Plant," in *Proc. of 23rd International Conference of Iranian Aerospace Society*, 2025 (Proceedings entry) (Report).

- H. Nobahari, **A. BaniAsad**, and A. Sharifi, "Linear Quadratic Integral Differential Game applied to the Real-time Control of a Quadrotor Experimental setup," *Proc. of 2022 10th RSI International Conference on Robotics and Mechatronics (ICRoM)*, 2022, pp. 578-583, doi: 10.1109/ICRoM57054.2022.10025263.

### Preprints and Under Review

- **A. BaniAsad**, H. Nobahari, "Robustness on Demand: Transformer-Directed Switching in Multi-Agent RL," (in preparation), 2025.

- R. Pordal, A. Sharifi, and **A. BaniAsad**, "Ellipsoidal Set-Theoretic Design of Robust Safety Filters for Constrained Linear Systems," arXiv: 2510.22790 [eess.SY], 2025. (preprint)

# PROFESSIONAL EXPERIENCE

## Work Experience

**Robotic Engineer at Fasta Robotics** fasta.technology 💼     Oct. 2024 – Present
*Multi-Rotor Autopilot & Control Systems Development*     Tehran, Iran

- Designed autopilot control loops with embedded RL; improved trajectory tracking.
- Developed guidance/navigation algorithms with embedded ML fusing GPS/IMU data.
- Conducted flight dynamics simulation and analysis using Isaac Sim and PyBullet.
- Implemented real-time control software in C/C++ and Python with ROS 2.
- Participated in system integration, laboratory and field testing to validate performance.
- Applied flight mechanics and robust control to enhance autopilot stability under disturbances.

## Academic Research

**Embedded RL Control for Robots** 🔗     Aug. 2022 – Apr. 2025
*Master's Thesis in Sharif University of Technology*     Tehran, Iran
Supervisors: Nobahari Hadi, PhD

- Designed zero-sum, disturbance-augmented training; policies stable under $10\times$ perturbations.
- Built 15k LOC RL stack (DDPG, TD3, SAC, PPO) in PyTorch/TensorFlow+Gym.
- Optimized neural networks via quantization for resource-constrained hardware.
- Validated robustness on Gymnasium tasks: Ant, Humanoid, HalfCheetah, Walker2d.
- Ported system to C++/Python ROS 2 node for hardware-in-the-loop testing.

**Researcher at CNAV Lab** 💼 🔗 ▶️     May 2020 – Feb. 2025
*Head of Lab (Former)*     Tehran, Iran
Supervisors: Nobahari Hadi, PhD and Sharifi Alireza, PhD

- Led embedded AI (C) and RL projects for robotic control and navigation.
- Developed LSTM-MLP for GPS-denied INS alignment; $< 0.1\%$ drift vs Kalman-INS. 🔗

**Game Theory-Based Control for 3-DoF Platform** 🔗 ▶️     Feb. 2021 – Sep. 2023
*Bachelor's Thesis — Sharif University of Technology*     **Best Thesis Award** 🏅
Supervisor: Nobahari Hadi, PhD

- Designed LQI differential-game controller; outperformed ADRC/DOBC in robustness.
- Deployed via MATLAB/Simulink-to-C pipeline for real-time 3-DoF quadcopter control.

# TEACHING EXPERIENCE

**Section Leader — Stanford University**     Apr. 2025 – June 2025

- Code in Place (CS106A) verify
- Mentor 10 international learners in Python.

**Teaching Assistant — Sharif University of Technology**     Sep. 2018 – Present

- Automatic Control (2021 – Present), Control Lab (2022 – Present), Dynamics (2023), Aircraft Design II (Fall 2021), Fundamentals of Programming C/C++ (Fall 2018)

**Community Outreach**     Sep. 2020 – Dec. 2021

- University Entrance-Exam Preparation, Virgol Charity.

## AWARDS AND HONORS

- Best Undergraduate Thesis — Iranian Aerospace Society                    2023
  *"Control of a 3-DOF Quadrotor Stand via LQI & Differential Game Theory"*
- National M.Sc. Entrance Exam (Aerospace) — Rank 23 / 1 000+             2022
- National B.Sc. Entrance Exam — Top 0.5 % of 150 000                     2017
- NODET — National Organization for Development of Exceptional Talents    2010-–2017

## TECHNICAL SKILLS

- **Programming Languages:**
  - C/C++
  - Embedded C
  - MATLAB
  - Python
- **Tools and OS:**
  - Git ❖
  - ROS
  - Terminal ❯_
  - Linux 🐧
  - Simulink
  - LaTeX
- **Libraries/Frameworks:**
  - **Machine Learning Libraries:**
    PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, OpenAI Gym, JAX
  - **Data Analysis and Visualization Libraries:**
    Matplotlib, NumPy, Pandas, Seaborn, Plotly
  - **Simulation Tools:** Isaac Sim, MuJoCo, PyBullet, Gazebo
- **Languages:** Farsi (Native), English (Full Professional Proficiency)
  The TOEFL iBT score is 96 (Reading: 26, Listening: 27, Speaking: 22, Writing: 21)

## NOTABLE COURSES

**Selected University Courses**                                          2017–2024

- **Programming & Numerics**: Basic C Programming (20/20), Numerical Calculations (20/20)
- **Math & Statistics**: Engineering Mathematics (19.8/20), Probability & Statistics (20/20)
- **Control Systems**: Automatic Control (18.1), Control Lab (18.5/20), Optimal Control (17.5/20)
- **Aerospace Engineering**: Aircraft Design II (18.3/20), Flight Dynamics II (18.3/20)
- **Research**: B.Sc. Thesis (20/20)

**Online Courses**                                                       2017–2024

- **Robotics Specialization** — Univ. of Pennsylvania (6 courses) verify
- **Reinforcement Learning Specialization** — Univ. of Alberta (4 courses) verify
- **AI Engineering Pro-Cert** — IBM (6 courses)
- **Accelerated Computing with CUDA Python** — NVIDIA
- **Neural Networks & Deep Learning** — deeplearning.ai verify
- **Python Data Structures** — Univ. of Michigan verify
- **Intro to Embedded Machine Learning** — Edge Impulse verify
- **Game Theory** — Stanford University verify