

Ali BaniAsad

Curriculum Vitae

Contact Information

✉ Email: alibaniasad1999@yahoo.com
🌐 LinkedIn: alibaniasad1999
🐙 GitHub: alibaniasad1999
📞 Phone: (+98) 991-214-7276

EDUCATION

M.S. Aerospace Engineering
Sharif University of Technology

September 2022 – December 2024 (Expected)

B.S. Aerospace Engineering
Sharif University of Technology

September 2017 – May 2022

RESEARCH INTERESTS

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

PUBLICATIONS

Journal Papers

- **Ali BaniAsad**, Reza Pordal , Alireza Sharifi, Hadi Nobahari. “Attitude Control of a 3-DoF Quadrotor Platform Using a Linear Quadratic Integral Differential Game Approach.” *ISA Transactions*, [Elsevier](#), 2024.
- Alireza Sharifi, **Ali BaniAsad**. “Robust In-Motion Transfer Alignment of Low-Grade Inertial Navigation Systems with Recurrent Neural Networks in the Event of Reference Malfunction.” *Engineering Applications of Artificial Intelligence*, 2024 ([Submitted](#)).
- **Ali BaniAsad**, Hadi Nobahari. “Robust Differential Game Reinforcement Learning with Soft Actor-Critic for Guidance in Low-Thrust Multi-Body Environments.” *Journal of Guidance, Control, and Dynamics*, *AIAA*, 2024 (Active).
- **Ali BaniAsad**, Alireza Sharifi. “Enhancing AHRS Results with Deep Learning LSTM Networks and Soft Actor-Critic for Real-Time Attitude Estimation in GNSS-Denied Environments” *IEEE Transactions on instrumentation and measurement* , 2024 (Active).

Conference Papers

- Hadi Nobahari, **Ali BaniAsad**, Alireza Sharifi. “Linear Quadratic Integral Differential Game Applied to the Real-time Control of a Quadrotor Experimental Setup.” *ICRoM*, [IEEE](#), 2022.

RESEARCH EXPERIENCE

Researcher at [CNAV Lab](#)   


May 2020 – Ongoing

Head of Lab (Current), Researcher (Former)

Tehran, Iran

Supervisors: Nobahari Hadi, PhD and Sharifi Alireza, PhD

- Integrated **Embedded AI** with C programming to enhance **Robotic Control** system.
- Developed AI-driven navigation systems ([INS-AI](#), [AHRS-AI](#)) to enhance **Precision** and **Safety**.
- Employed **ROS** for inter-robot networking and coordination in **Multi-Agent** systems.

Robust and Safe Reinforcement Learning 

August 2022 – December 2024 (Expected)

Master's Thesis in Sharif University of Technology

Tehran, Iran

Supervisors: Nobahari Hadi, PhD

- Investigated **Deep Reinforcement Learning** methods, comparing their performance with classical strategies, such as **MPC**, to identify strengths and weaknesses.
- Integrated **ROS** to test and validate robotic **Embedded RL** in **Real-World** scenarios.
- Utilized **Game Theory** to develop **Robust and Safe Multi-Agent** RL algorithms.

Game Theory-Based Control for a 3DoF Setup  

February 2021 – September 2023

Bachelor's Thesis in Sharif University of Technology

Tehran, Iran

Supervisors: Nobahari Hadi, PhD

Awarded the Best Undergraduate Thesis 

- Developed a robust **Robot** control system using **Differential Game Theory**.
- employed **Optimization** for **System Identification**, enhancing control **Reliability**.
- Tested the control strategy on a [3DoF setup](#), demonstrating the **Game-Theoretic** approach.

Coordination of Multi-Agent Autonomous Systems 

July 2023

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Nobahari Hadi, PhD

- Optimized a **Multi-Agent** model for **Communication Delays** and **Obstacle Avoidance**.
- Implemented and validated the model with **Simulink** simulations and **HIL** testing using **Embedded C** on a **Microcontroller**, ensuring robustness and reliability.

Multi-Objective Heuristic Optimization 

February 2023

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Nobahari Hadi, PhD

- Implemented the [REMARK](#) algorithm for **Multi-Objective Optimization** with **Conflict-ing** objectives, allowing for the effective evaluation of trade-offs.

Advanced Aircraft Trim Stability Analysis 

March 2022

Project in Sharif University of Technology

Tehran, Iran

Supervisors: Afshin Banazadeh, PhD

- Developed an advanced **User Interface** software, enhancing aircraft **Stability Analysis**.
- **Real-Time** visualization and **Interactive** adjustments for aircraft performance **Evaluation**.

AIAA Regional Jet Design Competition 

June 2021

Project in Sharif University of Technology [[Poster of the Aircraft](#)]

Tehran, Iran

Supervisors: Afshin Banazadeh, PhD

- Led regional jet design, integrating disciplines for **Performance** and **Industry Standards**.
- Developed a project [report](#) and presentation, highlighting **Design Choices** and simulation results, leading to a successful team presentation.

TEACHING EXPERIENCE

Teaching Assistant

- **Automatic Control** September 2021 – Present
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Nobahari Hadi](#), PhD and [Sharifi Alireza](#), PhD
- **Control Lab** September 2021 – Present
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Nobahari Hadi](#), PhD and [Sharifi Alireza](#), PhD
- **Dynamics** September 2021 – December 2023
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Sharifi Alireza](#), PhD
- **Introduction to Aerospace Engineering** September 2021 – December 2023
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Sharifi Alireza](#), PhD
- **Aircraft Design II** September 2021 – December 2021
Department of Aerospace Engineering, Sharif University of Technology
Instructors: [Banazadeh Afshin](#) PhD
- **Fundamentals of Programming (C/C++)** September 2018 – December 2018
Department of Computer Engineering, Sharif University of Technology
Instructor: [Nikbin Marjan](#)

Volunteer Teaching

- **University Entrance Exam Preparation** September 2020 – December 2021
Virgol Charity, Local Community
Provided educational support to underprivileged children as part of a local charity initiative.

AWARDS AND HONORS



Iranian Aerospace Society's Best Undergraduate Thesis Award 2023
Awarded for the exceptional undergraduate thesis titled "Control of a 3DOF Quadrotor Stand using a Linear-Quadratic-Integral Controller based on Differential Game Theory".

Ranked 23 2022
Ranked 23 among more than thousands participants in the Nationwide University Entrance Exam for Aerospace Engineering.

Ranked Top 0.5% 2017
Ranked Top 0.5% among 150,000 participants of Iran's Undergraduate University Entrance Exam.

Member of NODET 2010 – 2017
Recognized as an Exceptional Talent by Iran's National Elites Foundation, a National Organization Dedicated to the Development of Exceptionally Talented individuals ([NODET](#)).

TECHNICAL SKILLS

- **Programming Languages**
 - C/C++
 - Embedded C
 - MATLAB
 - Python 🐍
- **Tools and Platforms**
 - Git 
 - ROS
 - Terminal >_
 - Linux 
 - Simulink
 - L^AT_EX
- **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:** Gazebo, MuJoCo
- **Languages:** Farsi (Native), English (Full Professional Proficiency)
The TOEFL iBT score is 96 (Reading: 26, Listening: 27, Speaking: 22, Writing: 21)

NOTABLE COURSES

University Courses

2017 – 2024

Sharif University of Technology, Tehran, Iran

- **Programming and Computational Methods:**
 - Basic Programming of C (20)
 - Numerical Calculations (20)
- **Mathematics and Statistics:**
 - Engineering Mathematics (19.8)
 - Probability and Statistics (20)
- **Control Systems:**
 - Automatic Control (18.1)
 - Optimal Control (17.5)
 - Control Lab (18.5)
- **Aerospace Engineering:**
 - Aircraft Design II (18.3)
 - Flight Dynamics II (18.3)
- **Research and Projects:**
 - Bachelor Thesis (20)

- **Robotics:** [verify certificate](#)
Provided by University of Pennsylvania, Coursera
 - Aerial Robotics
 - Computational Motion Planning
 - Mobility
 - Perception
 - Estimation and Learning
 - Capstone
- **Reinforcement Learning:** [verify certificate](#)
Provided by University of Alberta, Coursera
 - Fundamentals of Reinforcement Learning
 - Sample-based Learning Methods
 - Prediction and Control with Function Approximation
 - A Complete Reinforcement Learning System
- **IBM AI Engineering:**
Provided by IBM, Coursera
 - Machine Learning with Python
 - Introduction to Deep Learning and Neural Networks with Keras
 - Building Deep Learning Models with TensorFlow
 - Introduction to Neural Networks and PyTorch
 - Introduction to Computer Vision and Image Processing
 - AI Capstone Project with Deep Learning
- **Neural Networks and Deep Learning:** [verify certificate](#)
Provided by deeplearning.ai, Coursera
- **Python Data Structures:** [verify certificate](#)
Provided by University of Michigan, Coursera
- **Introduction to Embedded Machine Learning:** [verify certificate](#)
Provided by Edge Impulse, Coursera
- **Game Theory:** [verify certificate](#)
Provided by Stanford University, Coursera

HOBBIES

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|---------------------|--------------|-----------------|
| • Violin 🎵 | • Coding 🖥️ | • Traveling ✈️ |
| • Classical Music 🎧 | • Swimming 🏊 | • Photography 📷 |
| • Reading 📖 | • Hiking 🏔️ | • Chess ♟️ |

REFERENCES

- **Sharifi, Alireza, PhD**


Assistant Professor of Aerospace Engineering, Sharif University of Technology

Dr. Sharifi Supervised my work in the [CNAV Lab](#) for over three years, during which we collaborated on multiple projects. I served as both a researcher and a teaching assistant during this time.

–  [Faculty Page at Sharif University](#)

–  ar.sharifi@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-8115

- **Nobahari, Hadi, PhD**


Professor of Aerospace Engineering, Sharif University of Technology

I have worked with Dr. Nobahari for over four years, including on both my master's and bachelor's theses.

–  [Faculty Page at Sharif University](#)

–  nobahari@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-4040

- **Banazadeh, Afshin, PhD**


Professor of Aerospace Engineering, Sharif University of Technology

I have taken several courses with Dr. Banazadeh, achieving excellent results. I developed a fully designed regional jet and created a GUI to facilitate and automate the design process. Additionally, I served as a teaching assistant for the “Airplane Design II” course for one year.

–  [Faculty Page at Sharif University](#)

–  banazadeh@sharif.edu

–  [Google Scholar Profile](#)

–  (+98)-21-6616-8108