# Mohammad Hussein Yoosefian Nooshabadi

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## Professional Summary

Doctoral researcher in Mechanical Engineering with a specialization in control theory, focusing on nonlinear and non-Gaussian state estimation, nonlinear and neural-network controllers, and applications of convex optimization. Demonstrated expertise in designing and implementing vision-based navigation systems and optimal control algorithms for autonomous robots. Adept at bridging theory and application, with a proven record of creating efficient and scalable guidance, navigation, and control algorithms that advance the capabilities of autonomous systems.

## Education

**Ph.D. in Mechanical Engineering** September 2022 –
Northeastern University, Boston, MA
*Advisor:* Dr. Laurent Lessard

**M.S. in Mechanical Engineering** January 2022
Sharif University of Technology, Tehran, Iran
*Advisor:* Dr. Nejat Pishkenari

**B.Sc. in Mechanical Engineering** August 2018
Isfahan University of Technology, Isfahan, Iran

## Professional Experience

**Doctoral Researcher** September 2022 –
Northeastern University Boston, MA

- Analysis and performance comparison of various Kalman Filters such as EKF, UKF, and Invariant EKF (IEKF) (sample code)
- Reachability analysis and safety verification of Neural Network controllers using semidefinite programming and linear programming (sample code)
- High-level control and planning with signal temporal logic predicates using mixed-integer programming (sample code)

**Research Assistant** August 2019 – January 2022
Sharif University of Technology Tehran, Iran

- Development of an Attitude-Position Estimation System for a Quadrotor Using IMU and Camera Data (video 1, video 2)
- Design, fabrication, calibration, and experimental test of a Visual-Inertial Odometry setup

**Research Assistant** August 2017 – August 2018
Isfahan University of Technology Isfahan, Iran

- Design and Fabrication of an Estimation System and a Control System for an Autonomous Quadrotor
- Dynamic Analysis and Control Design of a Quadrotor with a Suspended Load

**Research and Development Engineer** June 2019 – August 2019
at Sizan Pardazesh Kavir Company Kashan, Iran

- Developing a Bio-3dprinter (Press release)

## Software Skills

MATLAB, C++ (OpenCV), Python, CodeVisionAVR
CATIA, SOLIDWORKS, Altium Designer
Ubuntu, LaTeX

## Honors and Awards

Won full scholarship for both M.Sc. and B.Sc. studies.
Ranked within the top 0.1% in the Iranian National University Entrance Exam for M.Sc. studies in 2019.
Ranked within the top 1% in the Iranian National University Entrance Exam for B.Sc. studies in 2014.

## Selected Publications

**Yoosefian Nooshabadi, M.H.**, and Lessard, L. "From Divergence to Provable Stability: Regularized Correntropy Kalman Filters." Submitted to 2027 *American Control Conference (ACC)*.

**Yoosefian Nooshabadi, M.H.**, and Lessard, L. "State Estimation for Linear Systems with Non-Gaussian Measurement Noise via Dynamic Programming." In 2025 *IEEE 64th Conference on Decision and Control (CDC)*, 2025. (link, code)

**Yoosefian Nooshabadi, M.H.**, Sipahi, R., and Lessard, L. "Stealthy Optimal Range-Sensor Placement for Target Localization." In *IEEE Control Systems Letters*, 2024. (link)

Abdollahi, M.R., Pourtakdoust S.H., **Yoosefian Nooshabadi, M.H.**, and Nejat Pishkenari, H. " An Improved Multi-State Constraint Kalman Filter for Visual-Inertial Odometry." In *Journal of Franklin Institute*, 2024. (link)

**Yoosefian Nooshabadi, M.H.**, and Nejat Pishkenari, H. "Development of an Efficient Formulation for Volterra's Equations of Motion for Multibody Dynamical Systems." In *Scientia Iranica,* 2025. (link)

Abbasi, E., Ghayour, M., Danesh, M., and **Yoosefian Nooshabadi, M.H.** "Optimal path tracking of a quadrotor in the presence of obstacle using the League Championship Algorithm." In *2018 6th RSI International Conference on Robotics and Mechatronics (IcRoM)*, pp. 236-242. IEEE, 2018. (link)

Abbasi, E., Ghayour, M., Danesh, M., Amiri, P., and **Yoosefian Nooshabadi, M.H.** "Formation flight control and path tracking of a multi-quadrotor system in the presence of measurement noise and disturbances." In *2018 6th RSI International Conference on Robotics and Mechatronics (IcRoM)*, pp. 273-279. IEEE, 2018. (link)