Amir H. Khodabakhsh

Experienced Researcher Specializing in

Deep Learning and Stochastic Nonlinear Dynamics

EDUCATION

Sharif University of Technology

Ph.D., Flight Dynamics and Control (2017 - 2023)

Thesis: Development of a Smart Learning-Based Distributed Load Alleviation System for Future Generation of Aeroelastic Wings

Sharif University of Technology

M.Sc., Flight Dynamics and Control (2014 - 2016)

Thesis: Reliability-Based Multidisciplinary Design Optimization of an Aeroelastic Projectile

K. N. Toosi University of Technology

B.Sc., Aerospace Engineering (2009 - 2014)

Thesis: Design and Implementation of A Hardware-In-the-Loop Testbed for An Attitude Control System

Journal Publications

Khodabakhsh, A.H. and Pourtakdoust, S.H., 2024. Solution of FPK equation for stochastic dynamics subjected to additive Gaussian noise via deep learning approach. Structural Safety, 106, p.102399.

DOI: j.strusafe.2023.102399

Pourtakdoust, S. H. and **Khodabakhsh, A. H**., 2022. A deep learning approach for the solution of probability density evolution of stochastic systems. Structural Safety, 99, p.102256.

DOI: 10.1016/j.strusafe.2022.102256

Pourtakdoust, S.H. and **Khodabakhsh, A.H.**, 2023. Reliability-based multidisciplinary design optimization of an aeroelastic unpowered guided aerial vehicle. Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, p.09544100231198160.

DOI: 10.1177/09544100231198160

Pourtakdoust, S. H. and **Khodabakhsh, A. H**., 2023. Modeling and Simulation of Nonlinear Dynamics Using Physics-Informed Deep Neural Networks. Technology in Aerospace Engineering, 6(4), pp.25-36.

DOI: 10.30699/jtae.6.4.3

Contact

(+98 912) 640 8251

ahkhodabakhsh.github.io

a.h.khodabakhsh@gmail.com

0000-0002-0457-8673

Amir H. Khodabakhsh

@ahkhodabakhsh

About Me

With a strong background in nonlinear stochastic dynamics, I possess expertise in deep learning, aero-servo-elasticity, control, estimation, uncertainty quantification, and MDO. My passion for advanced scientific topics drives my commitment to learning, teaching, and contributing to the scientific community. My skill set encompasses computer systems, dynamic systems analysis, complemented by a deep understanding of probability, control, and optimization theories. Throughout my studies, I have gained valuable experience and published several papers in peer-reviewed journals. As a dedicated researcher, I am committed to continuing my scientific journey for the betterment of society.

Selected Personal Skills

Teamwork

Innovative Solution Provider

Curious and persistent

Khodabakhsh, A. H., Pourtakdoust, S. H., 2024. A Deep Learning Approach to Model Predictive Gust Load Alleviation for A Compliant Wing Subjected to Atmospheric Turbulence, Journal of Guidance, Control, and Dynamics

[Under Review]

Teaching Experience

Teaching Assistant, Flight Tests, SUT, 2021
Teaching Assistant, Flight Dynamics, SUT, 2017-2020
Instructor, MATLAB Introductory Course, HEDSA, 2015
Instructor, C# Coding of Engineering Concepts, HEDSA, 2015
Instructor, Intro. to LabView control loop implementation, SSDI 2015
Instructor, MATLAB and SIMULINK, SSDI 2014
Teaching Assistant, Automatic Control, KNTU, 2013
Instructor, MATLAB Introductory Course, KNTU, 2011
Instructor, Zodiac Mythology, a workshop held in Fajr High school, 2010
Instructor, Astronomy Introductory Course, Fajr High school, 2009

Selected Research Experience

Research Assistant, Sharif University of Technology, 2014-2024
Research Assistant, Space Systems Design Institute, 2012-2014
Conceptualized and designed the smart wing idea for Gust Load Alleviation
Developed a software framework for Multidisciplinary Design Optimization (MDO), focusing on aircraft reliability
Executed the design and implementation of a simulator for controlling satellite attitude
Optimized the design of a sub-scale supersonic wind tunnel as part of research experiences
Conceptualized and executed the construction of a reduced-scale supersonic wind tunnel
Implemented scheduling and control of a Stewart platform motion

Skills

Computer & Embedded Development: MATLAB, python, C/C++, C#, VB, Julia, Fortran and JS
Web Development, Front-End: Angular, React, Vue.js Back-End: .Net, Node.js
Multi-Thread programming, Parallel Computing, Distributed Computing Server
Mathematical Technical Languages: MAPLE and MATHEMATICA

Selected Professional Skills

Complex Systems Engineering
Process & Design Optimization

Languages

English (Fluent)
Persian (Fluent)
French (Basic)
Spanish (Basic)

Interests

Advanced Tech
Jogging
Reading

Computer simulation and control: SIMULINK, MapleSim and LABVIEW

Computer Aided design using: SolidWorks, AutoCAD and CATIA

Finite element structural analysis with: ANSYS mechanical ALPD, and ABAQUS

Computational Fluid Dynamics (CFD): ANSYS Fluent and ANSYS CFX

Research Interests

Nonlinear Stochastic Dynamics Analysis and Control

Deep Learning and Artificial Intelligence

Reinforcement Learning

Multidisciplinary Design Optimization (MDO)

Robotics and Autonomous Systems

Nonlinear Model Predictive Control (NMPC)