

Curriculum Vitae

Research Interests

Astrodynamics

Orbit/Attitude Determination, Dynamics and Control

Celestial Mechanics

Machine Learning

Education

Master of Science

Iran University of Science and Technology, Tehran, IR

GPA: 3.42/4 (17.10 / 20)

Thesis: "Coupled Orbit and Attitude Dynamics of a Spacecraft in the Ecliptic Restricted Three Body Problem"

Supervisor: Dr. Kamran Daneshjoo

Advisor: Dr. Majid Bakhtiari

Satellite Technology Engineering

Sep. 2017 - Jan. 2020

Bachelor of Science

Shahid Rajaei University, Tehran, IR

Thesis: "Vibration Analysis of a Rotary Shaft with Rigid or Flexible Bearings by Considering the Rotor Gyroscopic Effects"

Supervisor: Dr. Majid Shahgholi

Mechanical Engineering

Jan. 2013 - Jan. 2017

High School

Alameh Tabatabaei High School

Aleshtar, Lorestan, Iran

Mathematics and physics

Sep. 2007 - June. 2010

Some Courses

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|--|----------|---|---------|
| ○ Celestial Mechanics and Orbital Dynamics | 18.25/20 | ○ Special Courses in Satellite Technology (Sensors) | 19.5/20 |
| ○ Satellite Attitude Determination | 20/20 | ○ Satellite Attitude Control | 19.5/20 |

Online Courses

- Machine Learning (Stanford University) **Coursera certification** 98.82/100
- Reinforcement Learning Specialization (University of Alberta) **Coursera certification**
 - Fundamentals of Reinforcement Learning (University of Alberta) **Coursera certification** 98.75/100
 - Sample-based Learning Methods (University of Alberta) **Coursera certification** 100/100
 - Prediction and Control with Function Approximation (University of Alberta) **Coursera certification** 100/100
 - A Complete Reinforcement Learning System (Capstone) (University of Alberta) **Coursera certification** 100/100
- Spacecraft Dynamics and Control Specialization (University of Colorado Boulder) **Coursera certification**
 - Kinetics: Studying Spacecraft Motion (University of Colorado Boulder) **Coursera certification** 100/100
 - Kinematics: Describing the Motions of Spacecraft (University of Colorado Boulder) **Coursera certification** 93.26/100
 - Control of Nonlinear Spacecraft Attitude Motion (University of Colorado Boulder) **Coursera certification** 97.56/100
 - Spacecraft Dynamics Capstone: Mars Mission (University of Colorado Boulder) **Coursera certification** 96.33/100

Publications("Click to see")

Journals:

- Siavash Sabzy, Kamran Daneshjoo, Majid Bakhtiari "**Periodic attitude motions along planar orbits in the elliptic restricted three-body problem**", Advances in Space Research, Elsevier. (Published)
- Majid Bakhtiari, Ehsan Abbasali, Siavash Sabzy, Amirreza Kosari "**Natural Coupled Orbit-Attitude Periodic Motions in the Perturbed-CRTBP including Radiated Primary and Oblate Secondary**", Astrodynamics journal, Springer. (Accept 23-Sep-2022)
- Siavash Sabzy, Majid Bakhtiari, Elyas Rashno "**Distinguishing Periodic Attitude Motions from Poincaré Sections Using a Compatible Clustering Method**", Engineering Applications of Artificial Intelligence, Elsevier. (Under Review)

Conferences:

- Siavash Sabzy, Bahman Ghorbani Vaghei "**Designing Coupled Attitude and Orbit Control System of GEO Satellite During Orbit Transfer**", 2018 (DMECONF04). (Published)(in Persian)
- Siavash Sabzy, Majid Bakhtiari, Kamran Daneshjoo "**Investigating the Effect of Eccentricity and Mass Ratio of Primaries on the Structure of Lyapunov Orbits**", The 19th International Conference of Iranian Aerospace Society. (Accepted)

- Siavash Sabzy, Meisam Farajollahi ”Dynamical Simulation of MEMS Inertial Sensor for Measuring the Gravity Gradient Torque in Low Earth Orbit”, The 19th International Conference of Iranian Aerospace Society. (Accepted)(in Persian)

Work Experiences

- **IUST Space Research Center**
Tehran, IR
 - Space Systems Simulations [Advanced]
 - Orbit Determination [Advanced]
 - GNSS Hardware/Software (Constellations/Receiver) Simulations [Advanced]
 - Verification of the Model-Based Design approach (MIL, SIL, PIL and HIL testing) [experienced]
 - Space System Design [Basics]
 - Space Radiations [Basics]
 - Ground Station Software [Basics]
- **LEOCT**
Tehran, IR **Sep. 2018 - Jan. 2019 (Internship), Feb. 2019 - Sep. 2021 (Full-time); Sep. 2021 - Now (Part-time)**
 - Ephemeris (Navigation Message) Design for Low Earth Orbit Constellations [Advanced]
 - Precise Orbit Determinations (POD) [Advanced]

Researcher
Sep. 2021 - Now

Researcher

Research Experiences

- Finding periodic solutions in complex environments e.g. using and handling search methods for finding periodic dynamical (attitude/orbit) behaviors (Poincaré Sections, etc.); differential correction algorithms (Shooting Methods, as a mean for generating periodic orbit/attitude motions in multi-body systems) and solar sailing
- Investigation on Machine Learning and optimization methods for Astrodynamics Applications
- Investigation on the orbital motion of uncontrolled objects in multi body systems e.g. solar system

Language Skills

- **English** Fluent
TOEFL: 96, R:28, L:28, S:20, W:20
 - **Appointment Number:** 4033 1062 1446 1655
 - **Test Date:** June 05, 2021
- **Persian** Native

Skills

Programming Languages

- Octave
- Matlab
- Python: Numpy, conda-orekit, pyqt5

Software

- AGI STK: Systems Tool Kit
- GMAT: General Mission Analysis Tool
- SPENVIS: Space Environment Information System
- ESA MASTER tool
- ESA DRAMA tool

General Softwares

- LaTeX
- Microsoft Office

Academic Projects

- Analysis of the Spacecraft Attitude Dynamics in the CR3BP by the Mean of Maximum Gravity Torque Surfaces.
 - Supervisor: **Dr. Majid Bakhtiari**
- Design, Implementation and Verification of the Attitude Determination and Control Algorithms for the DeFFi Satellites.
 - Supervisor: **Dr. Seyed Majid Esmaeilzadeh**
- Investigating the Periodic Solutions of the Coupled Orbit-Attitude Perturbed Circular Restricted Three-Body Problem.
 - Supervisor: **Dr. Majid Bakhtiari**
- Simulation of MEMS Inertial Earth Sensor Dynamic for Measuring Gravity Gradient Torque in Low Earth Orbit.
 - Supervisor: **Dr. Meisam farajollahi**
- Investigating the Effect of Eccentricity and Mass Ratio of Primaries on the Structure of Lyapunov Orbits.
 - Supervisor: **Dr. Kamran Daneshjoo, Dr. Majid Bakhtiari**
- Satellite Lifetime Simulation.

- Supervisor: **Bahman Ghorbani Vaghei**

References

○ **Dr. Majid Bakhtiari**

School of New Technologies, Iran University of Science and Technology, Tehran, Iran

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Tel: +98-912-320-6574 [Google scholar](#)

○ **Dr. Kamran Daneshjoo**

Department of Mechanical engineering, Iran University of Science and Technology, Tehran, Iran

Email: kjoo@iust.ac.ir

Tel: +98-21-77240570 [Home page](#)

○ **Dr. Meisam farajollahi**

School of New Technologies, Iran University of Science and Technology, Tehran, Iran

Email: farajollahi@iust.ac.ir

Tel: +98-21-73225825 [Google scholar](#)