Siavash Sabzy | Curriculum Vitae

– Iran University of Science and Technology – School of New Technologies
(+98) 912 082 4919 • siavash_sabzy@alumni.iust.ac.ir
Date of Birth: Sep, 14, 1993: 28 years

Research Interests

Astrodynamics
Orbit/Attitude Dynamics and Control
Numerical Calculations
Machine Learning
Orbit/Attitude Determination

Education

- **Master of Science** — **Satellite Technology Engineering**
  Iran University of Science and Technology, Tehran, IR — **Sep. 2017 - Jan. 2020**
  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
- **Bachelor of Science** — **Mechanical Engineering**
  Shahid Rajaee University, Tehran, IR — **Jan. 2013 - Jan. 2017**
  Thesis: "Vibration Analysis of a Rotary Shaft with Rigid or Flexible Bearings by Considering the Rotor Gyroscopic Effects"
  Supervisor: Dr. Majid Shahgholi
- **High School** — **Mathematics and physics**
  Alameh Tabatabaei High School — **Sep. 2007 - June. 2010**
  Aleshtar, Lorestan, Iran

Some Courses

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

Online Courses

- Machine Learning (Stanford University) **Coursera certification** 98.82/100
- Fundamentals of Reinforcement Learning (University of Alberta) **Coursera certification** 98.75/100
- 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
- Spacecraft Dynamics Capstone: Mars Mission (University of Colorado Boulder) **Coursera certification** 96.33/100
- Control of Nonlinear Spacecraft Attitude Motion (University of Colorado Boulder) **Coursera certification** Ongoing
- Sample-based Learning Methods (University of Alberta) **Coursera certification** Ongoing

Publications("Click to see")

- **Journals:**
- Siavash Sabzy, Kamran Daneshjou, Majid Bakhtiari **"Periodic attitude motions along planar orbits in the elliptic restricted three-body problem"**, Advances in Space Research, Elsevier. **(Published)**
- Siavash Sabzy, Majid Bakhtiari, Elyas Rashno **"Distinguishing Periodic Attitude Motions from Poincaré Sections Using a Compatible Clustering Method"**, Submitted to Acta Astronautica.

- **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 Daneshjou **"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

Generally, my research experiences in the university were about the orbit and attitude dynamics of the spacecraft in the two or three-body regimes. After I graduated, I tried to use what I learned in real industrial applications. So, since Jan. 2020, I have

worked as an R&D expert in a startup company ("**LEOCT**"). In LEOCT, I have been faced with various tasks such as **Finding Periodic Solutions in Complex Environments**, **Ephemeris Calculations**, **Precise Orbit Determinations**, and **Solar Sailing**. All of the mentioned tasks were implemented in **MATLAB** and **Octave** programming languages.

Research Experiences

- Professional in Differential Correction Algorithms (Shooting Methods, as a mean for generating periodic orbits (or attitude motions) in multi-body systems)
- Professional in using and handling search methods for finding periodic attitude or orbit behaviors (Poincaré Sections, etc.)
- Investigation on Machine Learning and Optimization methods for Astrodynamics Applications
- Investigation on Ephemeris calculation process (providing precise orbit and clock products for LEO constellations), and other GNSS aspects (orbital mechanics related)

Skills

English : Fluent (TOEFL score: 96, R:28, L:28, S:20, W:20)
Persian : Native

Software
- STK
- SOLIDWORKS
- CATIA

programming languages
- Octave
- Matlab
- Python

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 DelFFi 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
  Email: bakhtiari_m@iust.ac.ir
  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**