# Bahram Yaghooti

## Research and Work Experience

http://alum.sharif.edu/~bahramyaghooti/

### Research Projects

**Control Laboratory, Sharif University of Technology** *Oct. 2016 - present*

- **Modeling and Control of Flexible Structures**
  - Finite Element Analysis of Structures Using ANSYS Workbench
  - Modal Testing
  - Validation of Finite Element Model Using Test Results
  - Design, Simulation, and Implementation of Closed Loop Control System
  - Comparison and Verification of Control System Simulation Results and Experimental Testing
- **Design and Manufacture of Motion Simulator and Hardware-In-the-Loop (HIL) Test System**
  - Mechanical Design and Manufacture of Servomechanism
  - Dynamic Simulation of Servomechanism Using ADAMS and Simulink
  - Design and Implementation of Closed-loop Control System Using ARM-Cortex-M3 Microcontroller
- **Design and Manufacture of Vibration Analyzer and Modal Testing**
  - Programming ARM-Cortex-M3 Microcontroller for Data Gathering
  - Development of a LabVIEW program for Signal Processing and Data Analysis
  - Design of a Graphical User Interface (GUI) with LabVIEW
  - Comparison of Finite Element Simulation Results and Experimental Vibration and Modal Testing

**Fankavan Aral Company** *Jan. 2016 - Sep. 2016*

- **Design and Implementation of a Distributed Control and Monitoring System for Automatic Fault Detection of Railway Vehicles**
  - Design and Development of Embedded Devices for Measuring Acceleration, Temperature, Voltage and Current
  - Implementation of a Network for Data Gathering
  - Data Analysis and Signal Processing (used for fault pattern detections)
  - Design of a Graphical User Interface (GUI) with LabVIEW

**Control Laboratory, Sharif University of Technology** *May 2014 - Sep. 2015*

- **Developing Adaptive Fractional Order PID Controller Design Methods for Fractional Order Systems**
  - Self-Tuning Regulator Design for Linear Fractional Order Systems
    - Parameters of the system are determined by identification methods
    - The controller gains are updated online based on pole placement method using Sequential Quadratic Programming (SQP) algorithm
  - Design of an Automatic Tuning Method of Fractional Order PID Controller for a Class of Linear Fractional Order Systems Using Model Reference Adaptive Control Techniques

  - Robust Adaptive Fractional Order PID controller Design for a Class of Fractional Order Nonlinear Systems based on Sliding Mode Control Techniques
  - Design of Direct Self-Tuning Fractional Order PID Control for a Class of Fractional Order Nonlinear Systems based on the Lyapunov Approach

- **Design and Implementation of Controller and Converter of Standard G-Code for Hexaglide CNC**
  - Development of an Algorithm for Converting Standard G-Code to Hexaglide G-Code Using Inverse Kinematics
  - Implementation of the Proposed Controller on Hexaglide CNC

**Joint Project between Iran Khodro Company and Sharif University** *Dec. 2013 - Feb. 2014*

- **Dynamic and Stress analysis of Hitachi Double Press Machine**
  - Comparison of Dynamic and Stress Analysis of a Die Press in Single and Double Action Modes Using Finite Eement Methods

**Durali System Design and Automation Center** *Jun. 2013 - Sep. 2013*

- **Wind Turbine Gearbox Detailed Design**
  - Design of Gears, Bearings and Shafts
  - Design and Stress Analysis of Gearbox Casing
  - Design of the Gearbox Lubrication System

**Control Laboratory, Sharif University of Technology** *Jan. 2013 - Jun. 2013*

- **Development of Simulation Software for Global Navigation Satellite System (GLONASS)**
  - Developing a Program with C++ for Simulation of GLONASS Using High Precision Orbit Propagator (HPOP) Algorithm
  - Comparison of Numerical Simulation Results and STK Software Results Using the SDP4 Algorithm.
  - Design of a Graphical User Interface (GUI) with C#

## Selected Course Projects

- **Adaptive PID Controller Design for Nonlinear Systems Using Lyapunov Approach**
  *Nonlinear Control, under supervision of Prof. Vossoughi* *Spring 2014*
- **Design, Manufacture, and Control of a Double Pendulum**
  *Mechatronics Lab., Team Project, under supervision of Prof. Vossoughi* *Fall 2014*
  - Control implementation (a DC-Motor with a gear-box attached to a disk) Using the **STM32F407VG** Microcontroller
  - Comparison between Simulation and Experimental Results Using PID Controller
- **Design of Hydraulic, Pneumatic and Automation Systems**
  *Hydraulics and Pneumatics, Team Project, under supervision of Prof. Durali* *Spring 2013*
  - Design of a **Power Pack**
  - Design of a **Compressed Air System**
- **Developing a G-code for Three Axis CNC Machine**
  *Production Methods, under supervision of Prof. Movahhedy* *Spring 2013*

- **Analysis of Structures Using Finite Element Method**
  *Applied Finite Element Methods, under supervision of Prof. Naghdabadi* *Spring 2013*
  - Modal Analysis
  - Transient Analysis
  - Buckling Analysis
  - Contact Analysis
  - Optimization Analysis

- **Design of Mechanical Machines Elements**
  *Design of Machine Elements II, Team Project, under supervision of Prof. Durali* *Spring 2012*
  - Design of **Belts, Chains, Drums, and Pulleys of a Power Transmission System**
  - Design of **Gearbox** of Power Transmission System of a Ropeway
  - Design of **Rear Axle of a Truck**
  - Design of a **Clutch**

- **Stress Analysis**
  *Solid Mechanics III, under supervision of Prof. Naghdabadi* *Fall 2012*
  - Thick-Walled Functionally Graded Cylinder Subjected to Temperature Gradient with Properties varying Exponentially along the Radius

- **Design of Several Heat Exchangers Using Aspen B-jac**
  *Design of Heat Exchangers, under supervision of Prof. Afshin* *Spring 2013*
  - Design of an Oil-Water Heat Exchanger
  - Design of an Air Cooler