

Address: 1 Mirada Dr. N. #307
Columbus 43035
Phone: (602) 338-1641
E-mail: jhemi.1@osu.edu

Ali Jhemi

EDUCATION

- 1999 The University of Minnesota Minneapolis, MN
Ph.D., Control Science & Dynamical Systems
Dissertation: Numerical Methods for Helicopter Trajectory Optimization in Engine Failure
- 1993 Washington University St. Louis, MO
M.S., Systems Science & Mathematics
Thesis: Nonlinear Optimal Regulation
- 1989 The University of Minnesota Minneapolis, MN
B.S., Mechanical Engineering
Senior Project: Digital Control of the Ball and Beam Problem

PROFESSIONAL EXPERIENCE

- August 2016 – present Ohio State University Columbus, Ohio
Teaching the following courses: MAE 3520, 3542, 4517, 4518, 4193, 2201, 4510, 4511, 5610,
- August 2014 – January 2016 SJEL Tozeur, Tunisia
Consulting Engineer
Provided consultation services for the design and construction of a light weight palm-tree elevator: Front-End Design, material selection, profile design, guiding mechanisms, stress analysis, tooling, testing
- 2008 – 2014 The American University of Sharjah Sharjah, UAE
Assistant Professor
- Taught the following courses: Dynamics, Statistics, Computer Applications, Engineering Measurement, Control Systems, Aircraft Stability and Control, Modeling & Simulation of Dynamic Systems, Mechatronics Design, Systems Optimization Methods
 - Advised over 500 undergraduate students
 - Advised 15 graduate students in the area of Unmanned Aerial Vehicles and Haptic controls. Research included:
 - Design and building of a Microchip 33F dsPIC based autopilot on a self-designed PCB
 - Design of a GNC solution, using a PC-104 platform, for a Barless Joker Helicopter
 - Integration of a Micro-Pilot autopilot on a Fryer Helicopter
 - Served in the following Mechanical/Mechatronics committees: ABET accreditation, Strategic planning, Thesis & Project Advisory, Curriculum, Outreach, Program Publicity & Student Recruitment, Graduate Students admission
- 2001 – 2008 The Boeing Company Mesa, AZ
Engineer/Scientist
- Worked on the design and development of the Apache Helicopter flight control

system

- Implemented a Dynamic Inversion Control-Law (CL) for the Apache AH-64-D
- Optimized CL gains using CONDUIT, MatLab, and Simulink
- Tested CL compliance with MIL-9094 and ADS-33 requirements
- Generated C code from Simulink models and integrated it into flight code Software
- Worked on the Apache 30 mm gun-control project (GSC)
 - Developed a complete 6DOF Matlab/Simulink dynamical model for the Turret/gun assembly mechanism. It included both rigid and flexible link modeling
 - Assisted designing the turret azimuth and elevation controllers. This work included: Control-law design, Signal conditioning & Complementary filters design, Source code generation from Simulink models, Hardware in the loop testing and verification, Actual testing of the gun at the shooting range
- Worked on the Little Bird project, an unmanned aerial Helicopter
 - Developed onboard numerical algorithms to compute geodetic coordinates of targets on the ground
 - Designed digital Kalman filters to attenuate noise and improve targeting accuracy
 - Wrote software modules to allow CL gain tuning on the fly
- Worked on the development of the Apache Fly-By-Wire system. Area of focus: Sidearm Controller Module (SCM)
 - Developed MatLab/Simulation models for the active sidearm controller unit (SCU)
 - Augmented and fine-tuned the existing SCU control-laws using HILS
 - Implemented and tested control-laws on the actual SCU
 - Designed and coded cueing parameters on active axes
 - Wrote software modules emulating the Flight Management Computer
 - Modified and debugged the SCM's real time-operating system, CMX
 - Authored the SCM software requirement document
- Acted as a liaison between our group and the Mathworks company

2006 – 2008

Arizona State University

Tempe, AZ

Consultant

- Provided expertise in designing, implementing, and testing control laws on medical robots
- Tested and validated the performance of pneumatic rehabilitation robots

1999 – 2001

The Aerospace Corporation

El Segundo, CA

Member of the Technical Staff

- Simulated a 6DOF Reusable Launch Vehicle (RLV) model that included aerodynamics, propulsion, and the flight control system
- Designed Lateral and Longitudinal autopilots for the RLV in both ascent and descent flight phases
- Introduced SNOPT, a large-scale optimization routine, to the GNC department and integrated it into an in-house sizing program. This was used

to optimize the trajectory and propellant of a Single Stage to Orbit (SSTO) vehicle

- Verified pre-flight and post-flight Titan IV telemetry data and compared against that of contractor's

1994 – 1999 The University of Minnesota Minneapolis, MN

Research/Teacher Assistant

- Conducted research on the UH-60 helicopter engine failures during takeoff and landing, a NASA funded project
- Taught classes in static; Textbook: Vector Mechanics for Engineers, Beer and Johnston
- Conducted recitations and graded homework in Helicopter Aerodynamics; Textbook: Basic Helicopter Aerodynamics, John Seddon
- Mechanics of Flight; Textbook: Introduction to Flight, John D. Anderson

1995 – 1997 Honeywell Technology Center Minneapolis, MN

Student Research Aid

- Assisted senior engineers develop the flight management system of a High Speed Civil Transport (HSCT) vehicle
- Optimized lateral trajectories of HSCT vehicle between several major world cities using Dynamic Programming

PROFESSIONAL ASSOCIATIONS

- American Helicopter Society
- American Institute of Aeronautics and Astronautics

SKILLS

Software: C, Fortran, MatLab, Simulink, CONDUIT, Easy5, RTW, MPLAB

Analysis: Strong modeling and analysis background; 6 DOF modeling experience; Aircraft modeling

Hardware: Experience with PC-104 and several Microchip microcontrollers

Other: Very experienced in Autopilot design and the Simulink RTW embedded coder

AWARDS RECEIVED

- USAID full Scholarship: 1985 -1991
- Full Research Assistantship: 1994 -1999

CITIZENSHIP

US Citizen

PUBLICATIONS

- Jafari, Amir Hossein, Rached Dhaouadi, and **Ali Jhemi**. "Nonlinear Friction Estimation in an Elastic Drive System using a Dynamic Neural Network-based Observer", Journal of Advanced Computational Intelligence and Intelligent Informatics Vol 17, No. 4, May 16, 2013
- El-Sinawi, Ameen, Mohammad AlHamaydeh, and **Ali Jhemi**. "Optimal Control of Magnetorheological Fluid Dampers for Seismic Isolation of Structures", Mathematical Problems in Engineering, April 21, 2013
- **Ali Jhemi**, Eric Carlson, Yiyuan Zhao, Robert T. N. Chen, "Optimization of

Rotorcraft Flight Following Engine Failure", The American Helicopter Society Journal, Vol. 49-No 2, April 2004

- Yiyuan Zhao, **Ali Jhemi**, Robert T. N. Chen, "*Optimal Vertical Takeoff and Landing Helicopter Operation in One Engine Failure*", Journal of Aircraft Vol. 33, No 2, March-April 1996
- Christopher I Byrnes, **Ali Jhemi**, "Shock waves for Riccati Partial Differential Equations Arising in Nonlinear Optimal Control" , Progress in Systems and Control Theory, Vol. 12, June 1992

CONFERENCES

- Amer A., **Ali A. Jhemi**, and Al-Jarrah, "*System Identification of the Joker-3 Unmanned Helicopter*", Conference of GNC, Minneapolis, MN, August 13-16, 2012
- Younes M. Al-Younes · Mohammed A. Al-Jarrah · **Ali A. Jhemi**, "*Linear vs Nonlinear Control Techniques for a Quadrotor Vehicle*", Proceeding of the 7th International Symposium on Mechatronics and its Applications (ISMA10), Sharjah, UAE, April, 2010
- Amer Al-Radaideh, M.A.Al-Jarrah, **Ali Jhemi**, and R.Dhaouadi, "*ARF60 AUS-UAV Modeling, System Identification, Guidance and Control: Validation Through Hardware in the loop Simulation*", Proceeding of the 6th International Symposium on Mechatronics and its Applications (ISMA09), Sharjah, UAE, March, 2009
- Yiyuan Zhao, Eric Carlson, **Ali Jhemi**, Robert T. N. Chen, "*Optimization of Rotorcraft Flight in Engine Failure*", The American Helicopter Society 56th Forum, May 2-4, 2000
- **Ali Jhemi**, Yiyuan Zhao, Robert T. N. Chen, "*Real-time Generation of Helicopter Trajectories for Cockpit Display*", 34th Aerospace Science Meeting & Exhibit, Jan. 1996