

ASEEM SUDHIR NEVREKAR

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OBJECTIVE: Seeking a faculty position that involves instruction to and mentorship of undergraduate and/or graduate engineering students

EDUCATION

- **Doctor of Philosophy (All But Dissertation), Aerospace Engineering, Fall 2023 (expected)**
University of Oklahoma, Norman, Oklahoma
GPA: 3.57
Dissertation: '*Select Problems in Aircraft Trajectory Optimization in the Presence of Wind*'
Involved solving trajectory optimization and optimal control problems using pseudo-spectral methods. These numerical techniques have a wide variety of applications in mechanical, aerospace and chemical engineering, physics, applied mathematics, industries like robotics and aerospace, as well as in operations research.
- **Master of Science, Aerospace Engineering, May 2007**
Syracuse University, Syracuse, New York
- **Bachelor of Engineering, Mechanical Engineering, May 2005**
K.J. Somaiya College of Engineering (affiliated with the University of Mumbai), Mumbai, India

TEACHING INTERESTS

Introductory engineering courses, Statics, Dynamics, Solid Mechanics, Fluid Mechanics, Aerodynamics, Flight Mechanics and Controls, Numerical Methods, Finite Element Methods, Optimization, Engineering Computing/Programming, Physics, Mathematics

TEACHING EXPERIENCE

- *Assistant Professor of Mechanical Engineering*, Fr. Conceicao Rodrigues College of Engineering, July 2023 – present
 - Teaching Disaster Management & Mitigation Measures, Data Analytics, and Engineering Mechanics (lectures and labs)
- *Adjunct Professor of Engineering and Physics*, Oklahoma City Community College, May 2015 – December 2016
 - Teaching Dynamics, Statics, Rigid Body Mechanics, Strength of Materials, Physical Sciences and Physics
- *Graduate Teaching Assistant*, School of Aerospace and Mechanical Engineering, University of Oklahoma, August 2007 – May 2013, January 2015 – May 2015, December 2018 – June 2020
 - Assisting instructors with setting and grading assignments, tests, quizzes and projects in the subjects of Finite Element Methods, Engineering Computing, Fluid Mechanics, Aero Propulsion, Aero Design, Introduction to Aerospace Engineering, Flight Mechanics and Flight Controls, conducting tutorials in and teaching said subjects as required
- *Geometry Instructor* for Sooner Upward Bound program, University of Oklahoma, June 2009 – July 2009
 - Teaching geometry to underprivileged high school students from low income families and inner-city schools in Oklahoma City
- *Grader*, Department of Mechanical and Aerospace Engineering, Syracuse University, August 2006 – May 2007
 - Grading homework and tests in the subjects of Advanced Mechanics of Materials, and Space Flight and Rocket Propulsion
- *Mathematics Tutor*, Tutoring and Learning Resource Center, Syracuse University, August 2005 – May 2007
 - Tutoring university athletes and undergraduate students with learning disabilities in Mathematics

COMPUTER SKILLS, PROGRAMMING LANGUAGES AND SOFTWARE PACKAGES

MATLAB, TOMLAB, ANSYS, C, Visual Studio, Microsoft Office, LaTeX

RESEARCH INTERESTS

Trajectory Optimization, Computational Science, Numerical Optimization and Controls, Numerical Methods in Engineering, Dynamic Systems

RELEVANT GRADUATE COURSEWORK

Elementary and Advanced Finite Element Methods, Structural Optimization, Advanced Mechanics of Materials, Vibrations, Theoretical and Computational Fluid Dynamics, Aeroelasticity, Flight Mechanics and Controls, Design for Manufacturing, Probability

ABSTRACT OF DOCTORAL DISSERTATION

In military and civilian flight operations, it is often necessary to determine the trajectory that enables an aircraft to complete a given maneuver in minimum time, consuming minimum fuel, covering maximum range, or optimizing a multi-objective cost function, subject to existing constraints, which include specified initial and boundary conditions, aerodynamic and power constraints, wind conditions, and bounds on the state and control variables. Trajectory optimizations for different types of aircraft are presented that yield the required optimal measure of performance, performed using equations governing the three-dimensional motion of a point mass model of the aircraft in the presence of wind, and the corresponding state and control variable time histories are determined.

INDUSTRY AND RESEARCH EXPERIENCE

- *Software Developer*, OrionNet Systems, LLC, Oklahoma City, Oklahoma, September 2014 – January 2015
 - Developing Visual Studio applications
- *Engineering Research Assistant (Summer Intern)*, ClimateCraft Inc., HVAC company in Oklahoma City, Oklahoma, May 2010 – August 2010
 - Aerodynamic Performance and Acoustic Testing of Air Handling Units
- *Graduate Research Assistant*, School of Aerospace and Mechanical Engineering, University of Oklahoma
- August 2007 – May 2013, January 2015 – May 2015, December 2018 – June 2020
 - Research on numerical methods and select problems in aircraft trajectory optimization
 - Research on the integration of Unmanned Aircraft Systems (UASs) into the national airspace

PUBLICATIONS

- Nevrekar, A. S., and Vedula, P., “*Optimal Performance of an Unpowered UAS in the Atmospheric Boundary Layer*”, under preparation for submission to *Drones*
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Minimum Time to Climb Performance of a Supersonic Aircraft in the Presence of Wind*”, under preparation for submission to *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Maximum Range Glide of a Supersonic Aircraft in the Presence of Wind*”, under preparation for submission to *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*, also presented at and published in the proceedings of 14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, 17-19 September 2012, Indianapolis, Indiana
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Minimum Fuel to Climb Performance of a Supersonic Aircraft in the Presence of Wind*”, under preparation for submission to *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Climb Performance of a Supersonic Aircraft*”, AIAA/ASME Oklahoma Symposium XXXIV, 29 March 2014, Edmond, Oklahoma
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*A Numerical Method for Aircraft Trajectory Optimization*”, ASME District E Early Career Technical Conference (ECTC), 29-31 March 2012, Baton Rouge, Louisiana
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Effects of Wind on Climb and Glide Performance of a Supersonic Aircraft*”, AIAA/ASME Oklahoma Symposium XXXII, 10 March 2012, Tulsa, Oklahoma
- Nevrekar, A. S., Striz, A. G., and Vedula, P., “*Determination of Optimal Trajectories for an Aircraft using a Chebyshev Pseudospectral Method*”, AIAA/ASME Oklahoma Symposium, 09 April 2011 XXXI, Norman, Oklahoma
- Nevrekar, A.S., Striz, A. G., and Vedula, P., “*Application of the Differential Quadrature Method (DQM) to Trajectory Optimization Problems*”, AIAA/ASME Oklahoma Symposium XXX, 10 April 2010, Stillwater, Oklahoma
- Nevrekar, A. S., and Striz, A. G., “*Integration of Unmanned Aircraft Systems into National Airspace*”, AIAA/ASME Oklahoma Symposium XXIX, 11 April 2009, Edmond, Oklahoma

OTHER PROJECTS

- Application of ANSYS to the optimization of truss bridges for minimum weight, beam analysis and modal analysis of airplane wings
- Research on the application and effectiveness of Differential Quadrature Method (DQM) as a tool for engineering optimization using MATLAB and TOMLAB
- Research on the experimental and theoretical study of Rolling Effectiveness of Multiple Control Surfaces
- Study and summarization of journal articles and conference papers pertaining to the efforts taken towards and the future prospect of the integration of Unmanned Aircraft Systems into the National Airspace System

SCHOLARSHIPS AND LEADERSHIP ACTIVITIES

- Awarded the Robberson Travel Grant at the University of Oklahoma, Fall 2012
- Awarded the Graduate Student Senate Conference Grant at the University of Oklahoma, Fall 2012
- *Student Member*, American Institute for Aeronautics and Astronautics (AIAA) and American Society for Mechanical Engineers (ASME)
- *Presenter*, “UAS R&D in Aerospace and Mechanical Engineering”, 1st Annual Unmanned Systems and Robotics Symposium, 02 August 2012, Norman, Oklahoma
- *Vice-President*, Aerospace and Mechanical Engineering Graduate Student Community (AME GSC) at the University of Oklahoma, 2011-12
- *Judge*, Oklahoma NASA Space Grant Award at the Oklahoma State Science and Engineering Fair, 25 March 2011, Ada, Oklahoma
- Performer with OU Arashi Taiko, a Japanese drumming group at the University of Oklahoma, 2008–2011
- *Vice-President for Internal Affairs*, India Student Association at the University of Oklahoma, 2008-09
- *President*, Center for Inquiry on Campus at the University of Oklahoma, 2008-09
- *Student Council Member and Joint Magazine Secretary*, K. J. Somaiya College of Engineering, Mumbai, 2003-04

PERSONAL INTERESTS

Reading, Writing, Cricket, Soccer, Fitness, Japanese drumming (Taiko), Cooking, Volunteering