Dr. Vivek Mukhopadhyay

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Position

Senior Research Engineer

Biography

- Sc.D. 1972 Aeronautics and Astronautics
  Massachusetts Institute of Technology
- S.M. 1970 Aeronautics and Astronautics
  Massachusetts Institute of Technology
  Cambridge, Mass 02139
- B.Tech. 1968 Aeronautical Engineering
  Indian Institute of Technology, Kharagpur
  India 721302 (President of India Gold Medal)

Position History

2003-2006 Senior Aerospace Engineer, Aeronautical Systems Analysis Branch, Systems Analysis and Concepts Directorate, NASA Langley Research Center, Hampton VA 23681

98-2003 Senior Aerospace Engineer, Systems Analysis Branch, Aerospace Systems, Concepts and Analysis Competency, NASA Langley

97-98 Special Assistant to Branch Head, HPCCP/MDO Applications Engineer and HSCT4.0 Software Development Project Team Leader, Multidisciplinary Optimization Branch, NASA Langley.

96-97 NASA Langley Floyd Thompson Fellow, at Massachusetts Institute of Technology, Lean Aerospace Initiative Office, Sloan School of Management, MIT Center for Technology, Policy & Industrial Development, and Aeronautics and Astronautics Department. Floyd Thompson Fellowship research at the Georgia Tech Aerospace Systems Design Lab

95-2009 Associate Editor, Journal of Guidance Control and Dynamics, American Institute of Aeronautics and Astronautics.

94-96 Senior Aerospace Engineer, Systems Analysis Branch, Aeronautical Systems Analysis Div., Airframe Systems Program Office, NASA Langley Research Center, Hampton, VA

89-94 Senior Aerospace Engineer, Aeroelastic Analysis and Optimization Branch, Aeroservoelasticity Branch, Structural Dynamics Div., Aeroelasticity Branch, NASA Langley Research Center, Hampton, VA

89-95 Adjunct Associate Professor, George Washington University , NASA/GWU Joint Institute for Advancement of Flight Sciences.

85-89 Engineering Specialist, Planning Research Corporation and Kentron International, Aerospace Technology Div.,

81-85 Associate Research Professor, George Washington University, NASA/GWU Joint Institute for Advancement of Flight Sciences, Hampton, VA 23681.

79-81 National Academy of Sciences, NRC/NASA Senior Research Associate, at NASA Langley Research Center, Hampton, VA 23681.

75-79 Assistant Professor, Aeronautical Engineering. Dept., Indian Institute of Technology.

72-75 Senior Research Engineer, Structures Div. Indian Space Research Organization, Vikram Sarabhai Space Center, India

68-72 Graduate Research Assistant and Junior Faculty, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA 02139.

Current Work Assignment

Blended Wing Body (BWB) Fuselage Structural Optimization
BWB Flexible Dynamics Model Development
Rotorcraft - Dynamics and Solid Model Development
High Altitude Long Endurance (HALE) Vehicle Design
Crew Exploration Vehicle Structural Design

Prior Research Projects and Technical Interests

Advanced Aerospace Concepts

Efficient Aerodynamic Shape and Integration (EASI): Conceptual Design Shop (CDS): Geometry Structural Layout and Packaging (GSLP)
Lunar Surface Access Module (LSAM) Concept Design
Blended Wing Body Concept Structural Design and Optimization
Director's Creativity and Innovation Initiative
ISAT REVCON "Joined-Wing Technology Evaluation" Systems Study"
Lean Aerospace Initiative, Lean Process Engineering, MIT
HSCT4/CJopt High Fidelity Multidisciplinary Analysis and Design
BWB Non Circular Pressurized Fuselage Structural Design
BWB Preliminary Flutter Analysis

Aero-servo-elasticity and Active Optimal Control

BACT Model Flutter Suppression Control Law Development
See MIT Lean Aerospace Initiative Slide and LAI Web site
Georgia Tech Aerospace Systems Design Lab
Interactive preliminary Flutter Analysis
Active Flexible Wing Flutter suppression control law development
Optimal Robust FSS/GLA control law design and optimization
On-line Controller Performance Evaluation during wind-tunnel test

Software and Analysis tools

CAD/Cam Solid and Surface Modeling and Design - SolidWorks
Rapid Finite Element Analysis - ProEngineer Mechanica and COSMOS/M
Interactive Weight Estimation - using MATHCAD

Interactive General Aviation Conceptual Design - MATHCAD
Aero-servo-elasticity, Stability and Control - MATLAB
HPCCP High performance Computing for Multidisciplinary Optimization
CORBA Common Object Request Broker distributed computing
JAVA Object oriented programming

Publications:

NASA Technical Report Server (key word "Mukhopadhyay")

V. Mukhopadhyay, S-Y. Hsu, B. H. Mason, M. D. Hicks, W. T. Jones, D. W. Sleight, J. Chu, J. L. Spangler, H. Kamhawi, J. L. Dahl , "Adaptive Modeling, Engineering Analysis and Design of Advanced Aerospace Vehicles," AIAA Paper 2006-2182, 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, May 1-4, 2006, Newport, RI
V. Mukhopadhyay, "Structural Configuration Analysis of Crew Exploration Vehicle Concepts," AIAA Paper 2006-2082, 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, May 1-4, 2006, Newport, RI.

Mukhopadhyay, V., "A Historical Perspective on Analysis and Control of Aeroelastic Responses," Journal of Guidance Controls, and Dynamics, " Vol. 26, No. 5, Sep.-Oct. 2003, pp. 673-684.

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Mukhopadhyay, "A Conceptual Wing Flutter Analysis Tool for Systems Analysis and Parametric Design Study," Paper no. IFASD 2003 US_27, International Forum on Aeroelasticity and Structural Dynamics," Amsterdam, The Netherlands, June 2003.

Mukhopadhyay, V., Sobieski, J., Kosaka, I., Quinn, G., and Charpentier, C.: Analysis, Design and Optimization of Non-cylindrical Fuselage for Blended-Wing-Body (BWB) Vehicle. AIAA Paper 2002-5664 Proc. 9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, Atlanta, Sep. 4-6, 2002.

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Mukhopadhyay, V., " Editorial: Benchmark Active Control Technology Special Section, Part-III " Journal of Guidance, Control, and Dynamics, Vol. 24, No. 1, 2001, Jan-Feb. pp. 146.

Mukhopadhyay, V., " Editorial: Benchmark Active Control Technology Special Section, Part-II " Journal of Guidance, Control, and Dynamics, Vol. 23, No. 6, Nov-Dec. 2000, pp. 1093.

Mukhopadhyay, V., " Transonic Flutter Suppression Control Law Design and Wind Tunnel Test Results, " Journal of Guidance, Control, and Dynamics, Benchmark Active Control Technology Special Section, Part-I, Vol. 23, No. 5, Sep-Oct. 2000, pp. 930-937.

Mukhopadhyay, V., " Editorial: Benchmark Active Control Technology Special Section, Part-I " Journal of Guidance, Control, and Dynamics, Vol. 23, No. 6, Sep-Oct. 2000, pp. 913.

Walsh, J. L., Townsend, J. C., Salas, A. O., Samareh, J. A., Mukhopadhyay, V., and Barthelemy, J. F., " Multidisciplinary High-Fidelity Analysis and Optimization of Aerospace Vehicles, Part 1: Formulation," AIAA Paper No. 2000-0418, Proc. 38th Aerospace Sciences Meeting and Exhibit, 10-13 January 2000, Reno NV.

Walsh, J. L., Weston, R. P., Salas, Samareh, J. A., Mason, B. H., Green, L. L., and Biedron, R. T., " Multidisciplinary High-Fidelity Analysis and Optimization of Aerospace Vehicles, Part 2: Preliminary Results," AIAA Paper No. 2000-0419, Proc. 38th Aerospace Sciences Meeting and Exhibit, 10-13 January 2000, Reno NV.

Mukhopadhyay, V., 'Transonic Flutter Suppression Control Law Design, Analysis and Wind-Tunnel Test Results,' Proc. Second International Conference On Nonlinear Problems In Aviation And Aerospace, Embry-Riddle Aeronautical University, Daytona Beach, USA, Edited by Prof. S. Sivasundaram, European Conf. Publications, Cambridge, UK,1998, Vol. 2, pp. 555-562

Mukhopadhyay, V., 'Transonic Flutter Suppression Control Law Design Using Classical And Optimal Techniques With Wind Tunnel Test Results,' Proc. 40th AIAA/ ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conf. St. Louis, Missouri, April 12-15, 1999. pp. 1657-1667

Mukhopadhyay, V., 'Transonic Flutter Suppression Control Law Design, Analysis and Wind-Tunnel Results,' NASA/ CP-1999-209136/PT 1, CEAS/AIAA/ICASE/NASA Langley: International Forum on Aero-elasticity and Structural Dynamics 1999 Williamsburg, VA, June 22_25, 1999, pp. 381-392.

Mukhopadhyay, V., 'An Interactive Software for Conceptual Wing Flutter Analysis and Parametric Study,' NASA TM 110276, August 1996.

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Mukhopadhyay, V., 'Interactive Flutter Analysis and Parametric Study for Conceptual Wing Design,' AIAA Paper 95-3943, 1st AIAA Aircraft Engineering, Technology and Operations Congress, Los Angeles, Calif. Sep. 19-21, 1995.

Mukhopadhyay, V.: Flutter Suppression Control Law Design and Testing for the Active Flexible Wing, Journal of Aircraft (Special Active Flexible Wing Issue) Vol. 32, No. 1, Jan-Feb. 1995, pp. 45-51.

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Pototzky, A. S., Wieseman, C.D., Hoadley, S. T. and Mukhopadhyay, V. NASA Tech Briefs LAR-14635 "Evaluating the Performance of Multi-input/Multi-output Digital Control System", 1992

Mukhopadhyay, V., 'Control Law Synthesis and Stability Margin Improvement using Constrained

Optimization, Advances in Control and Dynamics,' Vol. XXXII, International Academic Press Series, Edited by Prof. C. T. Leondes, Academic Press, 1990, pp.163-204.

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Mukhopadhyay, V., ' Digital Robust Control Law Synthesis Using Constrained Optimization,' Journal of Guidance, Control, and Dynamics, Vol. 12, No. 2, March-April 1989, pp.175-181.

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Mukhopadhyay, V., Newsom., J. R. and Abel, I., 'Reduced Order Optimal Feedback Control Law Synthesis For Flutter Suppression,' Journal of Guidance, Control, and Dynamics, Vol. 5, No. 4, July-Aug. 1982, pp.389-395.

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Mukhopadhyay, V. and Dugundji, J., 'Wind Excited Vibration of Square Section Cantilever Beam In Smooth Flow,' Journal of Sound and Vibration, Vol. 45, No. 3, April 1976, pp.329-339.

Mukhopadhyay, V., 'Lift Moment and Pressure Fluctuations on A Cambered Airfoil In Generalized Sinusoidal Flow Perturbations,' Mechanique Appliquee, Vol. 23, No 6, Nov-Dec. 1978.

Rao. S. P., Mukhopadhyay, V., and Rao. J. S., 'Unsteady Aerodynamic Forces On Cambered Blades Of An Elementary Axial Flow turbo-machine Stage,' Journal of Aeronautical Society Of India, Vol. 3, No. 3-4, May 1979.

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DESIGN REPORT: Many Authors: Configuration Control Document CCD-3: Blended Wing Body: Final Report Prepared By McDonnell Douglas Aerospace, Long Beach, CA Now Boeing Company. Under Contract NAS1-20275 NASA Langley Research Center, Oct. 1, 1997. (Section contribution: Mukhopadhyay, V " Structural Concepts Study of Non-circular Fuselage Configurations ").

Mukhopadhyay, V., 'An Interactive Software for Conceptual Wing Flutter Analysis and Parametric Study,' NASA TM 110276, August 1996.

Mukhopadhyay, V., Newsom., J. R., and Abel, I., 'A Method for Obtaining Reduced Order Control Laws For High Order Systems Using Optimization Techniques,' NASA TP-1876, August 1981.

Newsom., J. R. and Mukhopadhyay, V., 'Application Of Constrained Optimization to Active Control Of Aeroelastic Response,' NASA TM - 83150, June 1981

Adams, W. M.; Christhilf, D. M.*; Waszak, M. R.; Mukhopadhyay V. and Srinathkumar, S. NASA TP-4338 , "Design and Test of Three Flutter Suppression Controllers" October 1992

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Perry, B. III, Mukhopadhyay, V., Hoadley, S. T., Cole, S. R., Butrill, C. S. and Houck, J. A., 'Digital Implementation, Simulation and Testing of Flutter-Suppression Systems for the Active Flexible

Wing Wind-Tunnel Model', AIAA Paper 90-1074, Proc. of 31st AIAA SDM Conference, Long Beach, CA, April 1990. (Paper no. ICAS-90-1.3.2, Proc International Congress of Aeronautical Sciences, Stockholm, Sweden, Sep. 10-14, 1990. ICAS-90-1.3.2) The paper was judged as the best SDyD paper in 1990.

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Mukhopadhyay, V., 'Robust Control Law Synthesis Using Constrained Optimization,' NASA CP 3031, 1989, 2nd NASA/AIRFORCE Symposium: Recent Experiences in Multidisciplinary Analysis and Optimization,' Hampton, Va, September 28-30, 1988.

Mukhopadhyay, V., Pototzky, T. and Noll, T.: 'Control Law Synthesis and Optimization Software for Large Order Aeroservoelastic Systems,' NASA TM 101578, Part 2, Workshop on Computational Aspects in the Control of Flexible Systems, Williamsburg, VA, July 12-14, 1988, pp. 691-707.

Mukhopadhyay, V., Newsom., J. R.: 'Application Of Matrix Singular Value Properties For Evaluating Gain and Phase Margins Of Multiloop Systems,' NASA TM-84524, August 1982

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Useful Links and Web sites for Aircraft Designers

Courtesy of Raymer's Aircraft Conceptual Design site