



Fundamentals of Helicopter Dynamics

By C. Venkatesan

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Helicopter Dynamics Introduced in an Organized and Systematic Manner

A result of lecture notes for a graduate-level introductory course as well as the culmination of a series of lectures given to designers, engineers, operators, users, and researchers, **Fundamentals of Helicopter Dynamics** provides a fundamental understanding and a thorough overview of helicopter dynamics and aerodynamics. Written at a basic level, this text starts from first principles and moves fluidly onward from simple to more complex systems.

Gain Valuable Insight on Helicopter Theory

Divided into 11 chapters, this text covers historical development, hovering and vertical flight, simplified rotor blade model in flap mode, and forward flight. It devotes two chapters to the aeroelastic response and stability analysis of isolated rotor blade in uncoupled and coupled modes. Three chapters address the modeling of coupled rotor–fuselage dynamics and the associated flight dynamic stability, and provide a simplified analysis of the ground resonance aeromechanical stability of a helicopter.

- Explains equations derived from first principles and approximations
- Contains a complete set of equations which can be used for preliminary studies
- Requires a basic first–level course in dynamics, as well as a basic first–level course in aerodynamics

Useful for any student who wants to learn the complexities of dynamics in a flying vehicle, **Fundamentals of Helicopter Dynamics** is an ideal resource for aerospace/aeronautical, helicopter, and mechanical/control engineers, as well as air force schools and helicopter/rotorcraft manufacturers.

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Review

"The book provides useful models of helicopter dynamics. ... this volume fills a niche in the field of helicopter dynamics and some of its chapters could be used as an aid in an undergraduate or beginning graduate course in this field."

?*Journal of Intelligent and Robotic Systems*, January 2016

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?Vengalattore T. Nagaraj, Senior Research Scientist, Department of Aerospace Engineering, University of Maryland, College Park, USA

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?Gagan Deep Singh, Dynamics Group, Rotary Wing Research & Design Centre, Hindustan Aeronautics Limited, Bangalore

"Considering the fact that helicopter dynamics is a complex subject and no book covers the subject completely, the selection of the topic is appropriate for the subject and covers all the essential aspects. ...Being associated with the training of the test crew involved in helicopter design and development, I would definitely wish to have a copy of this book. The book has focused on certain areas which could be considered as unique and may not be found easily in the other books."

?George Thomas Vilakovelil, Air Force Test Pilots School, Bangalore, India

About the Author

Professor C. Venkatesan holds a master of science in physics from Indian Institute of Technology, Madras, and master and doctoral degrees in engineering from Indian Institute of Science Bangalore. After gaining experience in both industry and academic research, he joined the department of aerospace engineering, Indian Institute of Technology Kanpur as faculty. He has initiated strong academic and research activity at IIT-Kanpur in the field of helicopter aeroelasticity. He has more than 100 research publications both in journals and conferences. He has received awards from The Aeronautical Society of India. He is a Fellow of Indian National Academy of Engineering and Associate Fellow of American Institute of Aeronautics and Astronautics.

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