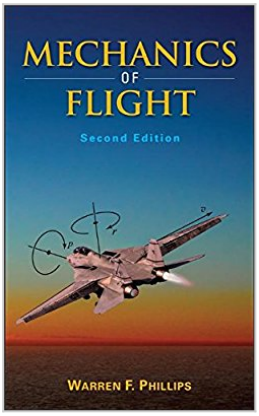

Mechanics of Flight

By Warren F. Phillips

Mechanics of Flight By Warren F. Phillips

Explains the principles of flight mechanics through worked examples and progressive problem solving

With its unique balance of breadth and depth, coupled with a comprehensive presentation of theory and applications, *Mechanics of Flight* is rapidly becoming the textbook of choice to enable readers to master the science and mathematics of flight mechanics. By progressively building on the formulation and solution of simpler problems associated with aircraft performance, static stability, and control, the author guides readers from fundamental principles to the development of the general equations of motion and continues through dynamic stability, aircraft handling qualities, and flight simulation.

In response to feedback from students, instructors, practicing engineers, and test pilots, this *Second Edition* features much new material, including new and updated coverage of:

- **Effects of nonlinear aerodynamics on aircraft stability**
- **Effects of tail dihedral on longitudinal and lateral stability**
- **Lateral trim, engine failure, and minimum-control airspeed**
- **Dynamic stability constraints and center-of-gravity limits**
- **Flight simulation in geographic coordinates**

Throughout the text, many new worked examples demonstrate how to apply principles of flight mechanics to solve engineering problems. Moreover, the text offers an array of modern and classical techniques for solving a broad range of problems in flight mechanics. Unique features include presentations of the numerical lifting-line method for efficient and accurate evaluation of stability derivatives and the quaternion formulation for six-degree-of-freedom flight simulation. Moreover, the author provides the detail needed to enable readers to write their own code.

Mechanics of Flight is designed as a textbook for a two-semester sequence of courses for students in mechanical and aerospace engineering. In addition, the text's self-contained chapters allow instructors to select individual topics for one-semester courses. The book is also a valuable reference for engineers working in the aerospace industry.

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Editorial Review

From the Back Cover
Complete and accessible coverage of flight mechanics

Mechanics of Flight is a unique combination of theory and applications organized in a logical presentation. This book provides extensive coverage of individual topics within flight mechanics, including overviews of aerodynamics and propulsion. This complete instructional reference offers a full range of modern and classical techniques for applying fundamental principles to the solution of engineering problems in fight mechanics.

Mechanics of Flight explores the basic principles of flight mechanics with the help of many worked examples, starting with simple problems involving steady-level flight and building to more complex ones such as the analysis of turning flight and spins. Special coverage found here–and not in most books on the subject–includes a detailed presentation of the quaternion formulation for six-degree-of-freedom flight simulation, including treatment of efficient numerical integration methods. Students and practicing engineers who are familiar with the principles of static stability and control can begin the study of flight dynamics in Chapter 7, starting with a review of coordinate systems and notation as well as a development of the more general rigid-body equations of motion.

Mechanics of Flight is an essential volume for mechanical and aerospace engineering students and a valuable reference for practicing engineers in the aerospace industry.

About the Author

WARREN F. PHILLIPS, PHD, is a Professor of Mechanical and Aerospace Engineering at Utah State University. Dr. Phillips has more than thirty-five years of experience teaching engineering analysis and design. He has also authored more than sixty scientific journal publications on thermal fluid science, aerodynamics, and flight mechanics.

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