



Elementary Flight Dynamics with an Introduction to Bifurcation and Continuation Methods

By Nandan K. Sinha, N. Ananthkrishnan

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Many textbooks are unable to step outside the classroom and connect with industrial practice, and most describe difficult-to-rationalize ad hoc derivations of the modal parameters. In contrast, **Elementary Flight Dynamics with an Introduction to Bifurcation and Continuation Methods** uses an optimal mix of physical insight and mathematical presentation to lead students to the heart of professional aircraft flight dynamics in a pleasant and informative manner.

Presenting an updated version of the aerodynamic model with the corrected definition of the rate (dynamic) derivatives, the book is peppered with examples of real-life airplanes, real airplane data, and solved examples. It plunges directly into the core concepts of aircraft flight dynamics with minimal mathematical fuss. When the 6-degree-of-freedom equations are presented in the final chapter, the students are already familiar with most of the physical concepts and the math is easier to absorb.

Aimed at junior and senior undergraduate students, this book covers recent developments in airplane flight dynamics and introduces bifurcation and continuation methods as a tool for flight dynamic analysis. Designed to help students make the transition from classroom calculations to the real-world of computational flight dynamics, it offers a practical perspective, enhanced by the inclusion of an open source computational tool.

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Review

"Flight dynamics is a topic that can cause difficulties to aerospace engineering students. This text leads the reader gently through the material with plenty of practical examples and student exercises. As such, it is easy to follow the material and to gradually develop a deep understanding of a demanding topic. The book is ideal for undergraduate students and is a good text for graduate students."

—James F Whidborne, Cranfield University, United Kingdom

"This textbook is written by two experienced university lecturers who, after ascertaining the views of their students on the most difficult aspects of this challenging subject, optimised the order in which these are taught and presented here. The book covers all the aspects of flight dynamics traditionally found in such texts interspersed with examples of the treatment of features of current air vehicles. ... In my opinion, this book covers the subject comprehensively and is a desirable reference source for undergraduates and graduates alike."

—R. J. Poole, MRAeS, *The Aeronautical Journal*

"The authors ... are well-known and respected professionals in teaching and research, especially in the areas of flight dynamics, stability and control, nonlinear dynamics and bifurcation methods. ... The book design and the methodology of interpretation are directed to a wide range of target audience/population interested in studying the dynamics of flight. Bachelor students can use it as recommended reading. For master and doctoral students, it is not only basic study material for particular problems of flight dynamics, but it also gives an idea of current professional approaches and computational methods for analysing dynamic properties. Given the scale and organization of information, the book will also be a useful tool in the analysis of flight dynamics for professionals in this field. The book is sure to appeal to anyone interested in the dynamics of flight."

—Jaroslav Salga, *Advances in Military Technology*, Vol. 9, No. 1, June 2014

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