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Flight Stability And Automatic Control, 2nd Edition



Synopsis

The second edition of Flight Stability and Automatic Control presents an organized introduction to the useful and relevant topics necessary for a flight stability and controls course. Not only is this text presented at the appropriate mathematical level, it also features standard terminology and nomenclature, along with expanded coverage of classical control theory, autopilot designs, and modern control theory. Through the use of extensive examples, problems, and historical notes, author Robert Nelson develops a concise and vital text for aircraft flight stability and control or flight dynamics courses. --This text refers to the Hardcover edition.

Book Information

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Customer Reviews

Not one of the most useful textbooks ever. I find that the material is often different from that which I learn in class. The techniques that my professor teaches are not always easy to discern in the text. I honestly don't understand why I was required to purchase this book, as I have not utilized it at all. The few times I've turned to it for assistance, it did not offer any. Perhaps if my teacher taught more closely with the book, it might be more helpful to me. But I find that the notes I am provided with in class are much more useful than this text.

Must have for the Aerospace Engineering student. It's pricey, but worth it

This is an excellent book for the modern fundamentals of aircraft control design. Most subjects are

clearly treated with just the right amount of illustrations and examples. The author makes good effort of explaining procedures without resorting to function calls from some software package. The last of the book devotes relatively little space to modern control theory. I would hope this talented writer would create something more advanced in the future that would expand on his treatment of the state observer and the use of the cost function.

Book seemed unorganized and not enough clear cut examples.

I found this textbook to include a large amount of concisely presented material on all aspects of aircraft stability and control and feedback control system design. It covers everything from the atmosphere, to development of forces and moments and equations of motion, to estimation of stability derivatives, analysis of dynamics and modes of motion, and handy reduced degrees of freedom. It also includes many examples of designing autopilots and stability augmentation systems. I really liked the examples which included both classical and state variable methods. Each chapter also has several interesting example problems. I would recommend this text for anyone in the field of aircraft or missile flight controls. The only disappointing aspect of the text is what I consider an excessive number of typographical errors. I would caution anyone not to use the equations or formulas without first checking the derivation. The derivations are clear and concise enough that the reader should be able to find these errors.

If this is a required text, as it was for me then buy it. The information isn't bad, and gives a good coverage of the subject, but the errata list I received from my professor spanned at least 20 pages, front and back. You'll learn controls with the right professor, but expect the book to confuse you with changing subscripts, even changing values in example problems. For example, the area of a wing in one example problem is listed as 945 ft^2 and yet the problem solves using the area of 965 ft^2 . Equations will be missing subscripts entirely, or duplicate them. For example, in one end of the chapter section of problems, the 2-D coefficient of lift for the tail is listed twice as opposed to giving you one value for the tail, and another for the wing as they should have. Expect to make assumptions like they have never been made before either. So much will not be given to you, it will be up to you to decide what value is reasonable that you'll use. Good luck to you if this is a required text.

The best aspect of this book is the simplicity in the exposition of ideas and concepts while giving

more than enough information for an introductory book. Fully worked out examples are frequent throughout the chapters and helps even further in getting good grasp of new materials. If the reader has taken introductory courses in Vibration and/or Feedback Control, the book should be an easy read. The book is roughly divided into two parts: The flight dynamics part and control part. In the flight dynamics part, the explanation smoothly leads the reader from equation of motion to the concept of stability derivatives and how they relate to dynamic stability. The derivatives are very well explained and then summarized in tables for a quick reference. In the control part, the author starts from the classic linear feed back control and proceeds to the modern state space method and introduces optimal control design using linear quadratic regulator. The control part is an amazing time saver. I have never seen a more efficient introduction to optimal control as applied to aircraft dynamics. If the reader wants a full fledged treatment of optimal control of aircraft, the materials presented here are far from enough, but as an introductory book, this is an excellent exposition that lets the reader get to pace quickly and have straight forward perspective on the subject. Although there were some blatant typos, it is an excellent work and I highly recommend the book.

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