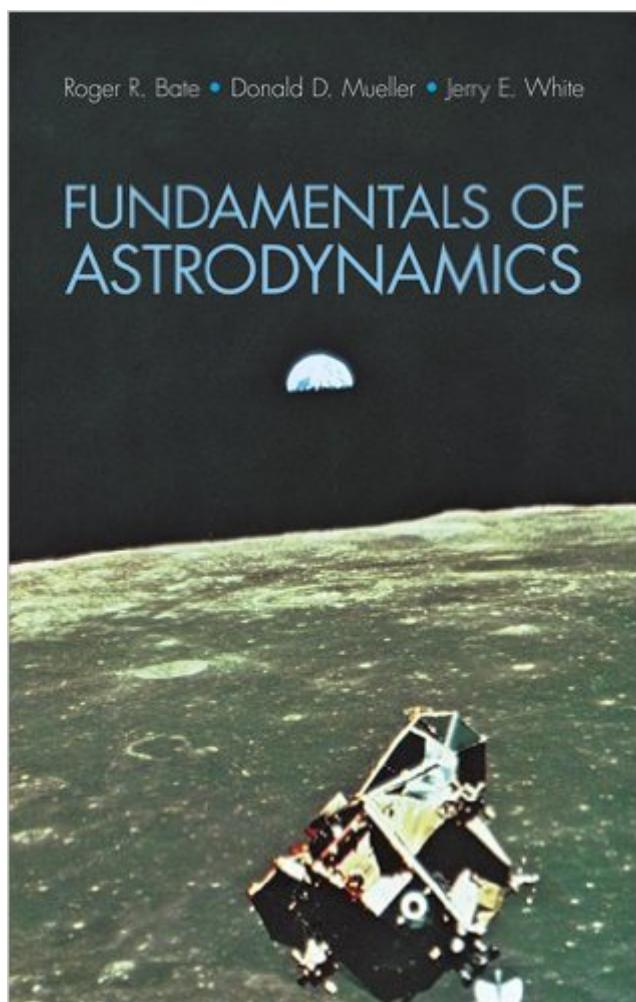


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Fundamentals Of Astrodynamics (Dover Books On Aeronautical Engineering)



Synopsis

When the United States Air Force Academy began teaching astrodynamics to undergraduates majoring in astronautics or aerospace engineering, it found that the traditional approach to the subject was well over 100 years old. An entirely new text had to be evolved, geared to the use of high speed digital computers and actual current practice in the industry. Over the years the new approach was proven in the classrooms of the Academy; its students entering graduate engineering schools were found to possess a better understanding of astrodynamics than others. So pressing is the need for superior training in the aerospace sciences that the professor-authors of this text decided to publish it for other institutions' use. This Dover edition is the result. The text is structured for teaching. Central emphasis is on use of the universal variable formulation, although classical methods are discussed. Several original unpublished derivations are included. A foundation for all that follows is the development of the basic two-body and n-body equations of motion; orbit determination is then treated, and the classical orbital elements, coordinate transformations, and differential correction. Orbital transfer maneuvers are developed, followed by time-of-flight with emphasis on the universal variable solution. The Kepler and Gauss problems are treated in detail. Two-body mechanics are applied to the ballistic missile problem, including launch error analysis and targeting on a rotating earth. Some further specialized applications are made to lunar and interplanetary flight, followed by an introduction to perturbation, special perturbations, integration schemes and errors, and analytic formulation of several common perturbations. Example problems are used frequently, while exercises at the end of each chapter include derivations and quantitative and qualitative problems. The authors suggest how to use the text for a first course in astrodynamics or for a two-course sequence. This major instructional tool effectively communicates the subject to engineering students in a manner found in no other textbook. Its efficiency has been thoroughly demonstrated. Dover feels privileged in joining with the authors to make its concepts and text matter available to other faculties.

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Customer Reviews

When the United States Air Force Academy began teaching astrodynamics to undergraduates majoring in astronautics or aerospace engineering, it found that the traditional approach to the subject was well over 100 years old. An entirely new text had to be evolved, geared to the use of high speed digital computers and actual current practice in the industry. Over the years the new approach was proven in the classrooms of the Academy; its students entering graduate engineering schools were found to possess a better understanding of astrodynamics than others. So pressing is the need for superior training in the aerospace sciences that the professor-authors of this text decided to publish it for other institutions' use. This Dover edition is the result. The text is structured for teaching. Central emphasis is on use of the universal variable formulation, although classical methods are discussed. Several original unpublished derivations are included. A foundation for all that follows is the development of the basic two-body and n-body equations of motion; orbit determination is then treated, and the classical orbital elements, coordinate transformations, and differential correction. Orbital transfer maneuvers are developed, followed by time-of-flight with emphasis on the universal variable solution. The Kepler and Gauss problems are treated in detail. Two-body mechanics are applied to the ballistic missile problem, including launch error analysis and targeting on a rotating earth. Some further specialized applications are made to lunar and interplanetary flight, followed by an introduction to perturbation, special perturbations, integration schemes and errors, and analytic formulation of several common perturbations. Example problems are used frequently, while exercises at the end of each chapter include derivations and quantitative and qualitative problems. The authors suggest how to use the text for a first course in astrodynamics or for a two-course sequence. This major instructional tool effectively communicates the subject to engineering students in a manner found in no other textbook. Its efficiency has been thoroughly demonstrated. Dover feels privileged in joining with the authors to make its concepts and text matter available to other faculties. A new work, first published by Dover in 1971.

Really. First chapter is like an orbital slap to the face but then you tell yourself you're ready for chapter two at which point you get punched in the nuts. Hell yeah. Everything I could need for an intro is in this book. If I need a question answered about an equation, it's thoroughly answered and fully described in this book. I really want a hardcover but that s*** DNE.

This is the first edition of a book from the 70's, and it shows. Although most of the content is correct, there are a few serious errors in the formulas that will presumably be corrected in the 2nd edition. It's somewhat entertaining seeing half of the formulas with sections drawn in by hand. They also go on a bit about the Soviets and the Red Chinese, which is always a treat. The units throughout the book are a random mix of nautical miles, kilometers, and canonical units. Overall the book does its job, but there are probably better orbital mechanics books out there.

For a beginner this book is both readable and practical. You could read the book to get a sense of the history of this material, and then learn the in depth derivations of the mathematics.

This is a engineering book for students and those of in the SC business coming up to speed on the subject and for reference later. Read the other commentaries for details. The one thing I walked away with was it is not as easy as I first thought to master the concepts. It seems that astrodynamics is a puzzle within a puzzle, and that once you are done reading & understand the concepts in the book you will have a greater appreciation of those who came before us who created deep space probes (JPL).

Great purchase! Recived the book in less than a week and in nearly great condition. This book is heavily informative for someone with no prior knowldge of dynamics or physics. However very intriguing and readable for someone who really wants to learn.

Very Good

I've seen an advance copy of the new 2015 2nd edition, and other than some intro updates, this classic from Dover is close to the same, however, the new edition is not that much more expensive (looks to be about \$5 US more), so is probably worth the wait unless you need this right away for a class. The new edition was scheduled for April 2014 and has been moved to late 2015, so I'm not

sure what it will really look like... stand by! That part of this review will be quickly dated, however, and in general, this classic is an inexpensive must have for rocket science, GIS, engineers, astronomers, and much more. I teach in these fields but do not agree with some of the folks that this is strictly basic and undergrad-- I use it in grad classes with other texts, and the students are always grateful that they have this, as it gives language descriptions to augment the math-- always a help, and a real must have if you're an autodidact. Was pleased to find that a tutorial I did for the Air Force Academy still required this! Highly recommended. The new edition is here: [Fundamentals of Astrodynamics: Second Edition \(Dover Books on Physics\)](#).

Very helpful book. Able to find information without spending a lot of time digging for it.

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