

# Astronomy On The Personal Computer Alexpa

This is a book for the amateur astronomer who wishes to carry out astronomical calculations using a personal computer with the minimum of fuss. It is not specific to any make of machine, neither are the programmes confined to specific calculations, Rather, it presents a collection of twenty-six subroutines, written in a portable version of BASIC, which can be mixed and matched according to personal requirements. Furthermore, the user need only have a broad understanding of the problem; the subroutines themselves take care of the details. For example, the routines can be used to calculate the time of rising of any of the planets in any part of the world at any time in the future or past; or they may be used to find the circumstances of the next solar eclipse visible from a particular place. Almost every problem likely to be encountered by the amateur astronomer can be solved by a suitable combination of the routines given here.

Presents an illustrated A-Z encyclopedia containing approximately 600 entries on computer and technology related topics.

Astronomy on the Personal Computer Springer

Astronomy in the Inca Empire was a robust and fundamental practice. The subsequent Spanish conquest of the Andes region disrupted much of this indigenous culture and resulted in a significant loss of information about its rich history. Through modern

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archaeoastronomy, this book helps recover and interpret some of these elements of Inca civilization. Astronomy was intricately woven into the very fabric of Andean existence and daily life. Accordingly, the text takes a holistic approach to its research, considering first and foremost the cultural context of each astronomy-related site. The chapters necessarily start with a history of the Incas from the beginning of their empire through the completion of the conquest by Spain before diving into an astronomical and cultural analysis of many of the huacas found in the heart of the Inca Empire. Over 300 color images—original artwork and many photos captured during the author’s extensive field research in Machu Picchu, the Sacred Valley, Cusco, and elsewhere—are included throughout the book, adding visual insight to a rigorous examination of Inca astronomical sites and history.

This volume presents recent work on Babylonian celestial divination and on the Greek inheritors of the Babylonian tradition. In the ancient world, the collection and study of celestial phenomena and the interpretation of their prophetic significance, especially as applied to kings and nations, were closely related sciences carried out by the same scholars. Both ancient sources and modern research agree that astronomy and celestial divination arose in Babylon. Only in the late nineteenth century, however, did scholars begin to identify and decipher the original Babylonian sources, and the process of understanding those sources has been long and difficult. This volume presents recent work on Babylonian celestial divination and on the Greek

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inheritors of the Babylonian tradition. Both philological and mathematical work are included. The essays shed new light on all of the known textual sources, including the omen series *Enuma Anu Enlil*, which contains omens from as far back as the early second or even third millennium, and the earliest personal horoscopes, from about 400 B.C., as well as the *Astronomical Diaries*, ephemerides, and other observational and mathematical texts. One essay concerns astronomical papyri that confirm the extensive transmission of Babylonian methods into Greek; a study of Ptolemy's lunar theory suggests that Ptolemy relied more on his own observations than previously thought; and an analysis of Theon's commentary on Ptolemy's *Handy Tables* shows that Theon explicated their meaning both conscientiously and competently. Contributors Asger Aaboe, Alan C. Bowen, Lis Brack-Bernsen, John P. Britton, Bernard R. Goldstein, Gerd Graßhoff, Hermann Hunger, Alexander Jones, Erica Reiner, F. Rochberg, N. M. Swerdlow, Anne Tihon, C. B. F. Walker

Well-balanced, carefully reasoned study covers such topics as Ptolemaic theory, work of Copernicus, Kepler, Newton, Eddington's work on stars, much more. Illustrated. References.

How to predict and calculate the positions of stars, planets, the sun, the moon, and satellites using a personal computer and high school mathematics. Our knowledge of the universe is expanding rapidly, as space probes launched decades ago begin to send information back to earth. There has never been a better time to learn about how planets, stars, and satellites move

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through the heavens. This book is for amateur astronomers who want to move beyond pictures of constellations in star guides and solve the mysteries of a starry night. It is a book for readers who have wondered, for example, where Saturn will appear in the night sky, when the sun will rise and set, or how long the space station will be over their location. In *Celestial Calculations*, J. L. Lawrence shows readers how to find the answers to these and other astronomy questions with only a personal computer and high school math. Using an easy-to-follow step-by-step approach, Lawrence explains what calculations are required, why they are needed, and how they all fit together. Lawrence begins with basic principles: unit of measure conversions, time conversions, and coordinate systems. He combines these concepts into a computer program that can calculate the location of a star, and uses the same methods for predicting the locations of the sun, moon, and planets. He then shows how to use these methods for locating the many satellites we have sent into orbit. Finally, he describes a variety of resources and tools available to the amateur astronomer, including star charts and astronomical tables. Diagrams illustrate the major concepts, and computer programs that implement the algorithms are included. Photographs of actual celestial objects accompany the text, and interesting astronomical facts are interspersed throughout. Source code (in Python 3, JAVA, and Visual Basic) and executables for all the programs and examples presented in the book are available for download at <https://CelestialCalculations.github.io>.

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The first edition of this very successful book was one winner of the Astronomical Society of the Pacific 'Astronomy Book of the Year' awards in 1986. There are a further seven subroutines in the new edition which can be linked in any combination with the existing twenty-six. Written in a portable version of BASIC, it enables the amateur astronomer to make calculations using a personal computer. The routines are not specific to any make of machine and are user friendly in that they require only a broad understanding of any particular problem. Since the programs themselves take care of details, they can be used for example to calculate the time of rising of any of the planets in any part of the world at any time in the future or past, or they may be used to find the circumstances of the next solar eclipse visible from a particular place. In fact, almost every problem likely to be encountered by the amateur astronomer can be solved by a suitable combination of the routines given in the book.

Cecilia Payne-Gaposchkin was the revolutionary scientific thinker who discovered what stars are made of. But her name is hard to find alongside those of Hubble, Herschel, and other great astronomers. Donovan Moore tells the story of Payne's life of determination against all the obstacles a patriarchal society erected against her. Explore planets, stars, and constellations with this "out of this world" educational activity book for kids ages 5-7 Space is awesome, and we can explore a lot of it from right here on Earth using our eyes, binoculars, and telescopes. In this interactive activity book, kids ages 5-7 get to be astronomers! Former NASA scientist Aurora

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Lipper leads an exciting journey through space, beginning with a tour of the planets and moons in our solar system. Next, kids visit the constellations and then zoom through the far reaches of the Milky Way galaxy. Along the way, they'll find amazing facts about the starry skies and get to color and draw, connect dots, find hidden objects, and have fun with word puzzles while improving math and reading skills. Astronomy Activity Book for Kids features:

- 90+ educational activities: On-page games and cool facts about space allow for fun, independent learning
- Simple stargazing projects: Learn how to find the Big Dipper, view meteor showers, and more with just the eyes, binoculars, or a small telescope
- Easy and exciting to read: Beautiful space illustrations and simple explanations written for early readers

Here is a one-volume guide to just about everything computer-related for amateur astronomers! Today's amateur astronomy is inextricably linked to personal computers. Computer-controlled "go-to" telescopes are inexpensive. CCD and webcam imaging make intensive use of the technology for capturing and processing images. Planetarium software provides information and an easy interface for telescopes. The Internet offers links to other astronomers, information, and software. The list goes on and on. Find out here how to choose the best planetarium program: are commercial versions really better than freeware? Learn how to optimise a go-to telescope, or connect it to a lap-top. Discover how to choose the best webcam and use it with your telescope. Create a mosaic of the Moon, or high-resolution images of the planets... Astronomy with a Home Computer is

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designed for every amateur astronomer who owns a home computer, whether it is running Microsoft Windows, Mac O/S or Linux. It doesn't matter what kind of telescope you own either - a small refractor is just as useful as a big "go-to" SCT for most of the projects in this book.

*A Century of Innovation: The Engineering that Transformed Our Lives* is a full-color coffee table book that details the greatest achievements of 20th-century engineering. Each chapter details one specific engineering "feat" with a discussion of the discovery's impact on society and descriptions and illustrations of how that discovery "works."

Fuel your child's imagination and desire to learn more through this astronomy book for kids! Inside its pages are carefully crafted texts with a child-friendly tone. The purpose is to help a child associate learning with fun. Encourage your child to self-learn about the Solar System. Grab a copy today!

From #1 New York Times bestselling author Dava Sobel, the "inspiring" (People), little-known true story of women's landmark contributions to astronomy A New York Times Book Review Notable Book of 2017 Named one of the best books of the year by NPR, The Economist, Smithsonian, Nature, and NPR's Science Friday Nominated for the PEN/E.O. Wilson Literary Science Writing Award "A joy to read." —The Wall Street Journal In the mid-nineteenth century, the Harvard College Observatory began employing women as calculators, or "human computers," to interpret the observations their male counterparts made via telescope

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each night. At the outset this group included the wives, sisters, and daughters of the resident astronomers, but soon the female corps included graduates of the new women's colleges—Vassar, Wellesley, and Smith. As photography transformed the practice of astronomy, the ladies turned from computation to studying the stars captured nightly on glass photographic plates. The “glass universe” of half a million plates that Harvard amassed over the ensuing decades—through the generous support of Mrs. Anna Palmer Draper, the widow of a pioneer in stellar photography—enabled the women to make extraordinary discoveries that attracted worldwide acclaim. They helped discern what stars were made of, divided the stars into meaningful categories for further research, and found a way to measure distances across space by starlight. Their ranks included Williamina Fleming, a Scottish woman originally hired as a maid who went on to identify ten novae and more than three hundred variable stars; Annie Jump Cannon, who designed a stellar classification system that was adopted by astronomers the world over and is still in use; and Dr. Cecilia Helena Payne, who in 1956 became the first ever woman professor of astronomy at Harvard—and Harvard’s first female department chair. Elegantly written and enriched by excerpts from letters, diaries, and memoirs, *The Glass Universe* is the hidden history of the women whose contributions to the burgeoning field of astronomy forever changed our understanding of the stars and our place in the universe.

A set of brief articles describing the history of and recent developments in areas of astronomy, computers, and



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communications. These articles were written over a period of five years for members of a retirement community.

Allows anyone to make astronomical calculations easily and accurately, ready to use on any IBM PC-type computer.

Knowledge Discovery in Big Data from Astronomy and Earth Observation: Astrogeoinformatics bridges the gap between astronomy and geoscience in the context of applications, techniques and key principles of big data. Machine learning and parallel computing are increasingly becoming cross-disciplinary as the phenomena of Big Data is becoming common place. This book provides insight into the common workflows and data science tools used for big data in astronomy and geoscience. After establishing similarity in data gathering, pre-processing and handling, the data science aspects are illustrated in the context of both fields. Software, hardware and algorithms of big data are addressed. Finally, the book offers insight into the emerging science which combines data and expertise from both fields in studying the effect of cosmos on the earth and its inhabitants. Addresses both astronomy and geosciences in parallel, from a big data perspective Includes introductory information, key principles, applications and the latest techniques Well-supported by computing and information science-oriented chapters to introduce the necessary knowledge in these fields

Since the dawn of humankind, people have looked upward to the heavens and tried to understand them. This encyclopedia takes you on an expedition through

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time and space to discover our place in the universe. We invite you to take a journey through the wonders of the universe. Explore the cosmos, from planets to black holes, the Big Bang, and everything in-between! Get ready to discover the story of the universe one page at a time! This educational book for young adults will launch you on a wild trip through the cosmos and the incredible discoveries throughout history. Filled to the brim with beautifully illustrated flowcharts, graphics, and jargon-free language, *The Astronomy Book* breaks down hard-to-grasp concepts to guide you in understanding almost 100 big astronomical ideas. Big Ideas How do we measure the universe? Where is the event horizon? What is dark matter? Now you can find out all the answers to these questions and so much more in this inquisitive book about our universe! Using incredibly clever visual learning devices like step-by-step diagrams, you'll learn more about captivating topics from the Copernican Revolution. Dive into the mind-boggling theories of recent science in a user-friendly format that makes the information easy to follow. Explore the biographies, theories, and discoveries of key astronomers through the ages such as Ptolemy, Galileo, Newton, Hubble, and Hawking. To infinity and beyond! Journey through space and time with us: - From Myth to Science 600 BCE - 1550 CE - The Telescope Revolution 1550 - 1750 - Uranus to Neptune 1750 - 1850 - The Rise of Astrophysics 1850 - 1915 - Atom, Stars, And Galaxies 1915 - 1950 - New Windows on The Universe 1950 - 1917 - The Triumph of Technology 1975 - Present The Series Simply Explained With over 7 million copies sold

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worldwide to date, *The Astronomy Book* is part of the award-winning *Big Ideas Simply Explained* series from DK Books. It uses innovative graphics along with engaging writing to make complex subjects easier to understand. Shortlisted: A Young Adult Library Services Association Outstanding Books for the College Bound and Lifelong Learners list selection A Mom's Choice Awards® Honoring Excellence Gold Seal of Approval for Young Adult Books A Parents' Choice Gold Award winner

Based on field notes made by the author during his own career as an amateur astronomer, this unique guide covers both the traditional and novel approaches to studying the night sky. In addition to the more standard techniques, it discusses the latest modern resources available to today's astronomer, such as personal computers, the Internet, and computerized telescopes. It includes practical advice on aspects such as site selection and weather; provides the reader with detailed instructions for observing the Sun, Moon, planets, and all types of deep-sky objects; and it introduces newer specialities such as satellite observing and the use of astronomical databases. The book concludes with detailed information about 200 stars, clusters, nebulae, and galaxies, suitable for viewing with modest-sized telescopes under suburban conditions. Written to complement *How to Use a Computerized Telescope*, this book will also appeal to astronomers with more traditional equipment.

This handbook provides both an overview of state-of-the-art scholarship in philosophy of science, as well as a

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guide to new directions in the discipline. Section I contains broad overviews of the main lines of research and the state of established knowledge in six principal areas of the discipline, including computational, physical, biological, psychological and social sciences, as well as general philosophy of science. Section II covers what are considered to be the traditional topics in the philosophy of science, such as causation, probability, models, ethics and values, and explanation. Section III identifies new areas of investigation that show promise of becoming important areas of research, including the philosophy of astronomy and astrophysics, data, complexity theory, neuroscience, simulations, post-Kuhnian philosophy, post-empiricist epistemology, and emergence. Most chapters are accessible to scientifically educated non-philosophers as well as to professional philosophers, and the contributors - all leading researchers in their field -- bring diverse perspectives from the North American, European, and Australasian research communities. This volume is an essential resource for scholars and students.

Before the Internet became widely known as a global tool for terrorists, one perceptive U.S. citizen recognized its ominous potential. Armed with clear evidence of computer espionage, he began a highly personal quest to expose a hidden network of spies that threatened national security. But would the authorities back him up? Cliff Stoll's dramatic firsthand account is "a computer-age detective story, instantly fascinating [and] astonishingly gripping" (Smithsonian). Cliff Stoll was an astronomer turned systems manager at Lawrence Berkeley Lab

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when a 75-cent accounting error alerted him to the presence of an unauthorized user on his system. The hacker's code name was "Hunter"—a mysterious invader who managed to break into U.S. computer systems and steal sensitive military and security information. Stoll began a one-man hunt of his own: spying on the spy. It was a dangerous game of deception, broken codes, satellites, and missile bases—a one-man sting operation that finally gained the attention of the CIA . . . and ultimately trapped an international spy ring fueled by cash, cocaine, and the KGB.

This book constitutes the joint refereed proceedings of six workshops held in conjunction with the 8th International Conference on Web Information Systems Engineering, WISE 2007 in Nancy, France, in December 2007. The 44 revised full papers presented were carefully reviewed and selected from numerous submissions for presentation in the six workshops. The workshops discuss a broad range of subjects.

Using information and scale as central themes, this comprehensive survey explains how to handle real problems in astronomical data analysis through a modern arsenal of powerful techniques. The coverage includes chapters or appendices on: detection and filtering; image compression; multichannel, multiscale, and catalog data analytical methods; wavelets transforms, Picard iteration, and software tools.

This 1909 publication charts the remarkable career of country station-master and amateur astronomer and inventor Roger Langdon.

It is a pleasure to present this work, which has been well

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received in German-speaking countries through four editions, to the English-speaking reader. We feel that this is a unique publication in that it contains valuable material that cannot easily-if at all-be found elsewhere. We are grateful to the authors for reading through the English version of the text, and for responding promptly (for the most part) to our queries. Several authors have supplied us, on their own initiative or at our suggestion, with revised and updated manuscripts and with supplementary English references. We have striven to achieve a translation of *Handbuch für Sternfreunde* which accurately presents the qualitative and quantitative scientific principles contained within each chapter while maintaining the flavor of the original German text. Where appropriate, we have inserted footnotes to clarify material which may have a different meaning and/or application in English-speaking countries from that in Germany. When the first English edition of this work, *Astronomy: A Handbook* (translated by the late A. Beer), appeared in 1975, it contained 21 chapters. This new edition is over twice the length and contains 28 authored chapters in three volumes. At Springer's request, we have devised a new title, *Compendium of Practical Astronomy*, to more accurately reflect the broad spectrum of topics and the vast body of information contained within these pages.

Astronomers and astrophysicists are making revolutionary advances in our understanding of planets, stars, galaxies, and even the structure of the universe itself. *The Decade of Discovery* presents a survey of this exciting field of science and offers a prioritized agenda

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for space- and ground-based research into the twenty-first century. The book presents specific recommendations, programs, and expenditure levels to meet the needs of the astronomy and astrophysics communities. Accessible to the interested lay reader, the book explores: The technological investments needed for instruments that will be built in the next century. The importance of the computer revolution to all aspects of astronomical research. The potential usefulness of the moon as an observatory site. Policy issues relevant to the funding of astronomy and the execution of astronomical projects. The Decade of Discovery will prove valuable to science policymakers, research administrators, scientists, and students in the physical sciences, and interested lay readers. Alternate Selection, Astronomy Book Club

A thorough introduction to the computation of celestial mechanics, covering everything from astronomical and computational theory to the construction of rapid and accurate applications programs. The book supplies the necessary knowledge and software solutions for determining and predicting positions of the Sun, Moon, planets, minor planets and comets, solar eclipses, stellar occultations by the Moon, phases of the Moon and much more. This completely revised edition takes advantage of C++, and individual applications may be efficiently realized through the use of a powerful module library. The accompanying CD-ROM contains the complete, fully documented and commented source codes as well as executable programs for Windows 98/2000/XP and LINUX.

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The second edition of *Electronic Imaging in Astronomy: Detectors and Instrumentation* describes the remarkable developments that have taken place in astronomical detectors and instrumentation in recent years – from the invention of the charge-coupled device (CCD) in 1970 to the current era of very large telescopes, such as the Keck 10-meter telescopes in Hawaii with their laser guide-star adaptive optics which rival the image quality of the Hubble Space Telescope. Authored by one of the world's foremost experts on the design and development of electronic imaging systems for astronomy, this book has been written on several levels to appeal to a broad readership. Mathematical expositions are designed to encourage a wider audience, especially among the growing community of amateur astronomers with small telescopes with CCD cameras. The book can be used at the college level for an introductory course on modern astronomical detectors and instruments, and as a supplement for a practical or laboratory class.

These oral histories by major participants in the Apollo program relive the events that culminated in the 1969 moon landing. Recollections of 14 participants include comments by NASA administrators James Webb and Thomas O. Paine; Wernher von Braun, architect of the Saturn V rocket; and astronauts Harrison Schmitt and Charles Duke. 69 black-and-white illustrations.

This long-awaited new edition of Montenbruck and Pfleger's successful book now includes chapters on



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perturbation calculations and on the calculation of physical ephemerides of the major planets and the sun. The book provides the reader with numerous programs and instructions for time and date calculation and for treating the two-body problem. Each chapter is carefully structured according to topic and closes with the listing of a relevant program, thereby facilitating its use as a practical handbook. The necessary astronomical and numerical fundamentals are also included in the text. The accompanying diskette has equally been completely revised.

The story of the people who see beyond the stars—an astronomy book for adults still spellbound by the night sky. Humans from the earliest civilizations through today have craned their necks each night, using the stars to orient themselves in the large, strange world around them. Stargazing is a pursuit that continues to fascinate us: from Copernicus to Carl Sagan, astronomers throughout history have spent their lives trying to answer the biggest questions in the universe. Now, award-winning astronomer Emily Levesque shares the stories of modern-day stargazers in this new nonfiction release, the people willing to adventure across high mountaintops and to some of the most remote corners of the planet, all in the name of science. From the lonely quiet of midnight stargazing to tall tales of wild bears loose in the observatory,

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The Last Stargazers is a love letter to astronomy and an affirmation of the crucial role that humans can and must play in the future of scientific discovery. In this sweeping work of narrative science, Levesque shows how astronomers in this scrappy and evolving field are going beyond the machines to infuse creativity and passion into the stars and space and inspires us all to peer skyward in pursuit of the universe's secrets.

Practical Astronomy with your Calculator, first published in 1979, has enjoyed immense success. The author's clear and easy to follow routines enable you to solve a variety of practical and recreational problems in astronomy using a scientific calculator. Mathematical complexity is kept firmly in the background, leaving just the elements necessary for swiftly making calculations. The major topics are: time, coordinate systems, the Sun, the planetary system, binary stars, the Moon, and eclipses. In the third edition there are entirely new sections on generalised coordinate transformations, nutation, aberration, and selenographic coordinates. The calculations for sunrise and moonrise are improved. A larger page size has increased the clarity of the presentation. This handbook is essential for anyone who needs to make astronomical calculations. It will be enjoyed by amateur astronomers and appreciated by students studying introductory astronomy. • Clear presentation • Reliable approximations • Covers

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orbits, transformations, and general celestial phenomena • Can be used anywhere, worldwide • Routines extensively tested by thousands of readers round the world

Presents a series of 250 significant events in the history of astronomy and space exploration, from the original formation of the galaxies, to the space mission to the planet Mars, to speculation about the end of the universe.

It is said that a typical astronomer of the 19th century spent seven hours working at a desk for every hour spent at the telescope. That's how long the routine analysis of data took with pencil, paper, and logarithmic tables. Thus when Wilhelm Olbers discovered the minor planet Vesta in 1807 and gathered the necessary observations, his friend Gauss needed almost 10 hours to hand calculate its orbit. That achievement astonished many less gifted astronomers of the time, who might have labored days to work out the orbit of a newfound comet. How different things are today! Gauss's method of orbit determination, presented in Chap. 11 of this book, runs to completion on a home computer in a few seconds at most. The machine will issue its accurate results in less time than it takes to key in the observations. In this book, a landmark in the youthful literature of astronomical computer algorithms, Oliver Montenbruck and Thomas Pfleger cover many topics of keen interest to the practical observer. For

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me its most remarkable feature is the library of interrelated program modules, all elegantly written in PAS CAL. Anyone who has tried to create such modules in interpreted BASIC soon runs into trouble: too few letters for variable names, not enough significant digits, and so on. These PASCAL routines are invoked one after another in coordinate transformations and calendar conversions.

The Solar System is a complex and fascinating dynamical system. This is the first textbook to describe comprehensively the dynamical features of the Solar System and to provide students with all the mathematical tools and physical models they need to understand how it works. It is a benchmark publication in the field of planetary dynamics and destined to become a classic. Clearly written and well illustrated, Solar System Dynamics shows how a basic knowledge of the two- and three-body problems and perturbation theory can be combined to understand features as diverse as the tidal heating of Jupiter's moon Io, the origin of the Kirkwood gaps in the asteroid belt, and the radial structure of Saturn's rings. Problems at the end of each chapter and a free Internet Mathematica® software package are provided. Solar System Dynamics provides an authoritative textbook for courses on planetary dynamics and celestial mechanics. It also equips students with the mathematical tools to tackle broader courses on

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dynamics, dynamical systems, applications of chaos theory and non-linear dynamics.

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