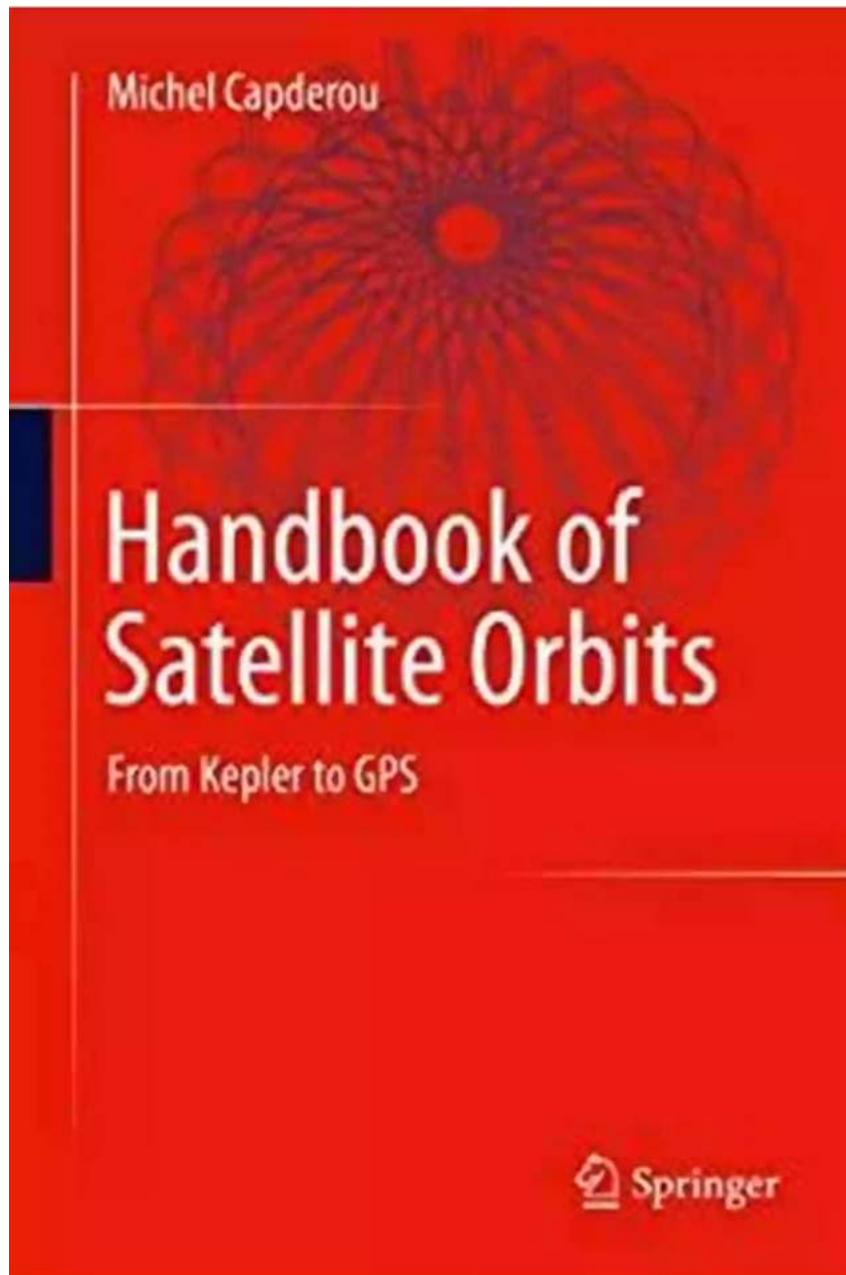


The Ultimate Handbook of Satellite Orbits: From Kepler to GPS

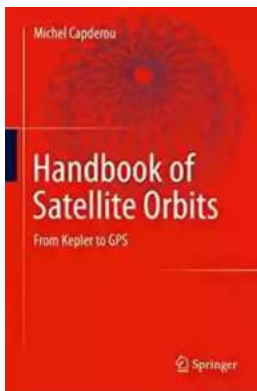


Satellites play a crucial role in our modern world, providing us with communication, navigation, weather forecasting, and many other services. Understanding the orbits of satellites is essential for their successful deployment and operation. In this comprehensive handbook, we dive into the fascinating

world of satellite orbits, from the classical principles established by Johannes Kepler to the advanced Global Positioning System (GPS) technology.

Chapter 1: Keplerian Orbits

In this chapter, we explore the fundamental laws of planetary motion developed by Johannes Kepler. We explain how these laws laid the groundwork for understanding satellite orbits and discuss the various types of Keplerian orbits, including circular, elliptical, and parabolic orbits. Through interactive diagrams and easy-to-understand explanations, we delve into the intricacies of these fascinating paths satellites follow around celestial bodies.



Handbook of Satellite Orbits: From Kepler to GPS

by Michel Capderou(2014th Edition, Kindle Edition)

★★★★★ 5 out of 5

| | |
|----------------------|--------------|
| Language | : English |
| File size | : 84123 KB |
| Text-to-Speech | : Enabled |
| Enhanced typesetting | : Enabled |
| Word Wise | : Enabled |
| Print length | : 1508 pages |
| Screen Reader | : Supported |



Chapter 2: Newtonian Mechanics and Satellite Dynamics

Sir Isaac Newton revolutionized the field of physics with his laws of motion and universal gravitation. In this chapter, we examine how Newton's laws are applied to describe the dynamics of satellites in space. We cover topics such as orbital perturbations, velocity changes, and the role of gravitational forces in maintaining stable satellite orbits.

Chapter 3: Earth-Centered Orbits

Earth-centered orbits are essential for various applications, including communication and scientific missions. In this chapter, we delve into the different types of Earth-centered orbits, such as geostationary orbits, low Earth orbits (LEO), medium Earth orbits (MEO), and highly elliptical orbits (HEO). We discuss the benefits and challenges associated with each orbit type and how they are used in practical applications.

Chapter 4: Satellite Constellations

Satellite constellations are groups of multiple satellites working together to provide global coverage and enhanced capabilities. This chapter explores the concept of satellite constellations, including the famous GPS constellation. We analyze the arrangement, orbital mechanics, and synchronization techniques employed to ensure optimal performance of these constellations.

Chapter 5: Advanced Orbit Determination Techniques

In this chapter, we shift our focus to advanced techniques used to precisely determine and maintain satellite orbits. We discuss the role of ground-based tracking systems, satellite laser ranging, and the Global Navigation Satellite System (GNSS). We also explore real-life examples showcasing the importance of accurate orbit determination for navigation and satellite operations.

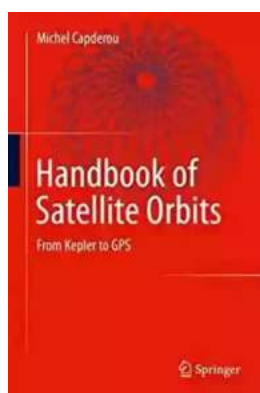
Chapter 6: Future Trends in Satellite Orbits

The field of satellite orbits is constantly evolving, driven by technological advancements and increasing demands for connectivity. In this final chapter, we speculate on the future of satellite orbits. We explore emerging concepts such as mega-constellations, space debris mitigation, and new propulsion technologies that will shape the future of satellite deployments and operations.

This handbook provides a comprehensive guide to understanding the intricacies of satellite orbits, from the foundational principles established by Kepler to the cutting-edge GPS technology used today. Whether you are a space enthusiast, a student, or a seasoned professional, this handbook will equip you with the necessary knowledge to explore the vast universe of satellite orbits.

Written by: Your Name

Published on: October 31, 2021



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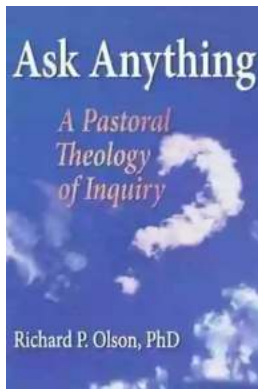
Fifty years after Sputnik, artificial satellites have become indispensable monitors in many areas, such as economics, meteorology, telecommunications, navigation and remote sensing. The specific orbits are important for the proper functioning of the satellites. This book discusses the great variety of satellite orbits, both in shape (circular to highly elliptical) and properties (geostationary, Sun-synchronous, etc.). This volume starts with an into geodesy. This is followed by a presentation of the fundamental equations of mechanics to explain and demonstrate the properties for all types of orbits. Numerous examples are

included, obtained through IXION software developed by the author. The book also includes an exposition of the historical background that is necessary to help the reader understand the main stages of scientific thought from Kepler to GPS.

This book is intended for researchers, teachers and students working in the field of satellite technology. Engineers, geographers and all those involved in space exploration will find this information valuable.

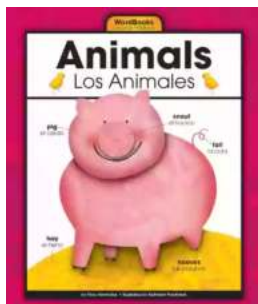
Michel Capderou's book is an essential treatise in orbital mechanics for all students, lecturers and practitioners in this field, as well as other aerospace systems engineers.

—Charles Elachi, Director, NASA Jet Propulsion Laboratory



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