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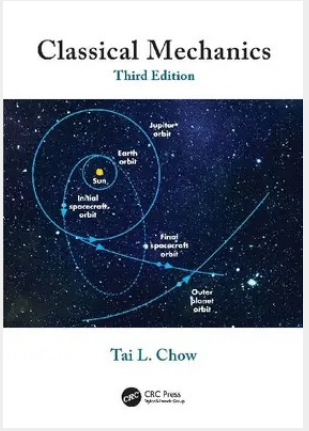
Classical Mechanics



The third edition of Classical Mechanics presents a complete account of the classical mechanics of particles and systems for physics students at the advanced undergraduate level. The textbook evolved from a set of lecture notes for a course on the subject taught for many years by the author at California State University, Stanislaus. It assumes the reader has been exposed to a course in calculus and a calculus-based general physics course. However, no prior knowledge of differential equations is required. Differential equations and new mathematical methods are developed in the text as the occasion demands. The book begins with fundamental concepts, such as velocity and acceleration. Vectors are used from the start. Unlike conventional textbooks, this textbook introduces Lagrangian and Hamiltonian formulations of mechanics early on, enabling students to develop confidence in these essential methods. Special note is given to concepts instrumental in the development of modern physics, including the relationship between symmetries and the laws of conservation. Applications to other branches of physics are also included wherever possible. Generalized coordinates are covered to enable discussion of Lagrangian dynamics and Hamiltonian dynamics, which have important applications in quantum mechanics, statistical mechanics, celestial mechanics, and electrodynamics. Key features: - Lengthier sections in early chapters have been rewritten as short and easy-to-understand sections. - Each chapter contains homework problems of varying degrees of difficulty to enhance understanding of the material in the text. - Detailed but not overlong mathematical manipulations are provided. - The essential topics can be covered in a one-semester, four-hour course.

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