



Classical Mechanics: Transformations, Flows, Integrable and Chaotic Dynamics

By Joseph L. McCauley

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An advanced text for first-year graduate students in physics and engineering taking a standard classical mechanics course, this is the first book to describe the subject in the context of the language and methods of modern nonlinear dynamics. The organizing principle of the text is integrability vs. nonintegrability. It introduces flows in phase space and transformations early and illustrates their applications throughout the text. The standard integrable problems of elementary physics are analyzed from the standpoint of flows, transformations, and integrability. This approach allows the author to introduce most of the interesting ideas of modern nonlinear dynamics via the most elementary nonintegrable problems of Newtonian mechanics. This text will also interest specialists in nonlinear dynamics, mathematicians, engineers and system theorists.

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Classical Mechanics: Transformations, Flows, Integrable and Chaotic Dynamics By Joseph L. McCauley Bibliography

- Rank: #2190187 in Books
- Brand: Brand: Cambridge University Press
- Published on: 1997-05-13
- Original language: English
- Number of items: 1
- Dimensions: 9.72" h x .98" w x 6.85" l, 1.79 pounds
- Binding: Paperback
- 488 pages



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Review

"...a fascinating account of the history and foundations of mechanics... a significant and timely, and indeed personal, contribution to the literature on mechanics, and one which will sit comfortably alongside other definitive Cambridge publications." The Times Higher Education Supplement

"This new book on classical dynamics based on new discoveries in chaos is needed and justified because it is written from a new perspective....A particular merit of this book is its instructive presentation of examples of simple dynamic systems....This is a thought provoking book...[it] can serve as both a textbook for physics and engineering graduate students and a reference or self-study book for physicists, engineers and mathematicians....Serious readers who are interested in chaotic dynamics are advised to read Chaos, Dynamics and Fractal--An Algorithmic Approach to Deterministic Chaos by the same author (Cambridge University Press, 1993)." Journal of Mechanical Engineering Science

"...well written and easy to follow. It provides an excellent physical insight into the modern theory of nonlinear dynamics. This reviewer enjoyed reading this book very much because it clarifies many issues which are presented in an abstract format in other books." Applied Mechanics Reviews

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