W. Thirring

A Course in Mathematical Physics

Vol. 1

Classical Dynamical Systems

Contents: Introduction. — Analysis on Manifolds. — Hamiltonian Systems. — Non-relativistic Motion. — Relativistic Motion. — The Structure of Space and Time. — References. — Index.

This is the first of a four-volume series of books discussing the fields of physics that have reached mathematical maturity: classical (nonquantum) mechanics, classical field theory, and quantum mechanics. The volume *Classical Dynamical Systems* starts with the development of the concept of a manifold which provides the abstract mathematical setting for all of mechanics. This is followed by a discussion of Hamiltonian systems, canonical transformations, constants of motion and perturbation theory. Certain specific problems are discussed in considerable detail: non-relativistic motion of particles and systems, relativistic motion in electromagnetic and gravitational fields, and the structure of black holes.

The book is suitable as a textbook for students in physics, mathematics, and applied mathematics. It is unique in its combination of mathematical rigor and realistic physical approach. Numerous examples and remarks accompany the text and help organize and motivate the material.

The author is a world-renowned theoretical physicist, with teaching experience in the US and in Europe.

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