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Título: Differentiable Manifolds: A Theoretical Physics Approach

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This textbook gives a concise introduction to the theory of differentiable manifolds, focusing on their applications to differential equations, differential geometry, and Hamiltonian mechanics.

The work's first three chapters introduce the basic concepts of the theory, such as differentiable maps, tangent vectors, vector and tensor fields, differential forms, local one-parameter groups of diffeomorphisms, and Lie derivatives. These tools are subsequently employed in the study of differential equations (Chapter 4), connections (Chapter 5), Riemannian manifolds (Chapter 6), Lie groups (Chapter 7), and Hamiltonian mechanics (Chapter 8). Throughout, the book contains examples, worked out in detail, as well as exercises intended to show how the formalism is applied to actual computations and to emphasize the connections among various areas of mathematics.

Differentiable Manifolds is addressed to advanced undergraduate or beginning graduate students in mathematics or physics. Prerequisites include multivariable calculus, linear algebra, differential equations, and (for the last chapter) a basic knowledge of analytical mechanics.