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Nota di contenuto	1 Introduction -- 1.1 Definitions and notation -- 1.2 Existence and uniqueness -- 1.3 Gronwall's inequality -- 2 Autonomous equations -- 2.1 Phase-space, orbits -- 2.2 Critical points and linearisation -- 2.3 Periodic solutions -- 2.4 First integrals and integral manifolds -- 2.5 Evolution of a volume element, Liouville's theorem -- 2.6 Exercises -- 3 Critical points -- 3.1 Two-dimensional linear systems -- 3.2 Remarks on three-dimensional linear systems -- 3.3 Critical points of

Sommario/riassunto

On the subject of differential equations many elementary books have been written. This book bridges the gap between elementary courses and research literature. The basic concepts necessary to study differential equations - critical points and equilibrium, periodic solutions, invariant sets and invariant manifolds - are discussed first. Stability theory is then developed starting with linearisation methods going back to Lyapunov and Poincaré. In the last four chapters more

advanced topics like relaxation oscillations, bifurcation theory, chaos in mappings and differential equations, Hamiltonian systems are introduced, leading up to the frontiers of current research: thus the reader can start to work on open research problems, after studying this book. This new edition contains an extensive analysis of fractal sets with dynamical aspects like the correlation- and information dimension. In Hamiltonian systems, topics like Birkhoff normal forms and the Poincaré-Birkhoff theorem on periodic solutions have been added. There are now 6 appendices with new material on invariant manifolds, bifurcation of strongly nonlinear self-excited systems and normal forms of Hamiltonian systems. The subject material is presented from both the qualitative and the quantitative point of view, and is illustrated by many examples.