

1. Record Nr.	UNINA9911144657303321
Autore	Hirsch Morris W. <1933->
Titolo	Differential equations, dynamical systems, and linear algebra // Morris W. Hirsch and Stephen Smale
Pubbl/distr/stampa	New York, : Academic Press, 1974
ISBN	1-281-76362-4 9786611763626 0-08-087376-6
Descrizione fisica	1 online resource (373 p.)
Collana	Pure and applied mathematics ; ; v. 60
Altri autori (Persone)	SmaleStephen <1930-> HirschMorris W. <1933->
Disciplina	510.8 s515.35 510/.8 s 515/.35 512.5 515.35 515/.35
Soggetti	Differential equations Algebras, Linear
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Front Cover; Differential Equations, Dynamical Systems, and Linear Algebra; Copyright Page; Contents; Preface; CHAPTER 1. FIRST EXAMPLES; 1. The Simplest Examples; 2. Linear Systems with Constant Coefficients; Notes; CHAPTER 2. NEWTON'S EQUATION AND KEPLER'S LAW; 1. Harmonic Oscillators; 2. Some Calculus Background; 3. Conservative Force Fields; 4. Central Force Fields; 5. States; 6. Elliptical Planetary Orbits; Notes; CHAPTER 3. LINEAR SYSTEMS WITH CONSTANT COEFFICIENTS AND REAL EIGENVALUES; 1. Basic Linear Algebra; 2. Real Eigenvalues 3. Differential Equations with Real, Distinct Eigenvalues4. Complex Eigenvalues; CHAPTER 4. LINEAR SYSTEMS WITH CONSTANT COEFFICIENTS AND COMPLEX EIGENVALUES; 1. Complex Vector Spaces; 2. Real Operators with Complex Eigenvalues; 3. Application of Complex Linear Algebra to Differential Equations; CHAPTER 5. LINEAR SYSTEMS AND EXPONENTIALS OF OPERATORS; 1. Review of Topology in R^n ; 2.

New Norms for Old; 3. Exponentials of Operators; 4. Homogeneous Linear Systems; 5. A Nonhomogeneous Equation; 6. Higher Order Systems; Notes; CHAPTER 6. LINEAR SYSTEMS AND CANONICAL FORMS OF OPERATORS

1. The Primary Decomposition 2. The S + N Decomposition; 3. Nilpotent Canonical Forms; 4. Jordan and Real Canonical Forms; 5. Canonical Forms and Differential Equations; 6. Higher Order Linear Equations; 7. Operators on Function Spaces; CHAPTER 7. CONTRACTIONS AND GENERIC PROPERTIES OF OPERATORS; 1. Sinks and Sources; 2. Hyperbolic Flows; 3. Generic Properties of Operators; 4. The Significance of Genericity; CHAPTER 8. FUNDAMENTAL THEORY; 1. Dynamical Systems and Vector Fields; 2. The Fundamental Theorem; 3. Existence and Uniqueness; 4. Continuity of Solutions in Initial Conditions

5. On Extending Solutions 6. Global Solutions; 7. The Flow of a Differential Equation; Notes; CHAPTER 9. STABILITY OF EQUILIBRIA; 1. Nonlinear Sinks; 2. Stability; 3. Liapunov Functions; 4. Gradient Systems; 5. Gradients and Inner Products; Notes; CHAPTER 10. DIFFERENTIAL EQUATIONS FOR ELECTRICAL CIRCUITS; 1. An RLC Circuit; 2. Analysis of the Circuit Equations; 3. Van der Pol's Equation; 4. Hopf Bifurcation; 5. More General Circuit Equations; Notes; CHAPTER 11. THE POINCARÉ-BENDIXSON THEOREM; 1. Limit Sets; 2. Local Sections and Flow Boxes; 3. Monotone Sequences in Planar Dynamical Systems

4. The Poincaré-Bendixson Theorem 5. Applications of the Poincaré-Bendixson Theorem; Notes; CHAPTER 12. ECOLOGY; 1. One Species; 2. Predator and Prey; 3. Competing Species; Notes; CHAPTER 13. PERIODIC ATTRACTORS; 1. Asymptotic Stability of Closed Orbits; 2. Discrete Dynamical Systems; 3. Stability and Closed Orbits; CHAPTER 14. CLASSICAL MECHANICS; 1. The n-Body Problem; 2. Hamiltonian Mechanics; Notes; CHAPTER 15. NONAUTONOMOUS EQUATIONS AND DIFFERENTIABILITY OF FLOWS; 1. Existence, Uniqueness, and Continuity for Nonautonomous Differential Equations

2. Differentiability of the Flow of Autonomous Equations

Sommario/riassunto

This book is about dynamical aspects of ordinary differential equations and the relations between dynamical systems and certain fields outside pure mathematics. A prominent role is played by the structure theory of linear operators on finite-dimensional vector spaces; the authors have included a self-contained treatment of that subject.
