

**Hirsch, Morris W.; Smale, Stephen; Devaney, Robert L.**

**Differential equations, dynamical systems, and an introduction to chaos. 2nd ed.** (English)

Zbl 1135.37002

Pure and Applied Mathematics (Amsterdam) 60. Amsterdam: Elsevier/Academic Press (ISBN 0-12-349703-5). xiv, 417 p. (2004).

This is an excellent text for an advanced undergraduate course in Differential Equations. It is a completely revised and updated version of the classic Hirsch-Smale text called “Differential Equations, Dynamical Systems and Linear Algebra” (see [Zbl 0309.34001](#)). According to the change in title, the linear algebra approach is less ambitious than in the first edition.

Contents: Preface; First Order Equations; Planar Linear Systems; Phase Portraits for Planar Systems; Classification of Planar Systems; Higher Dimensional Linear Algebra; Higher Dimensional Linear Systems; Nonlinear Systems; Equilibria in Nonlinear Systems; Global Nonlinear Techniques; Closed Orbits and Limit Sets; Applications in Biology; Applications in Circuit Theory; Applications in Mechanics; The Lorenz System; Discrete Dynamical Systems; Homoclinic Phenomena; Existence and Uniqueness Revisited.

Reviewer: [Olaf Ninnemann \(Berlin\)](#)

**MSC:**

- [37-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to dynamical systems and ergodic theory
- [34-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to ordinary differential equations
- [34Cxx](#) Qualitative theory for ordinary differential equations

Cited in **4** Reviews  
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