1. Record Nr. UNINA9910955000403321

Autore	Walter Wolfgang
Titolo	Ordinary Differential Equations / / by Wolfgang Walter
Pubbl/distr/stampa	New York, NY : , : Springer New York : , : Imprint : Springer, , 1998
ISBN	1-4612-0601-4
Edizione	[1st ed. 1998.]
Descrizione fisica	1 online resource (XI, 384 p.)
Collana	Graduate Texts in Mathematics, , 2197-5612 ; ; 182
Disciplina	515
Soggetti	Mathematical analysis Analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	I. First Order Equations: Some Integrable Cases -- § 1. Explicit First Order Equations -- § 2. The Linear Differential Equation. Related Equations -- § 3. Differential Equations for Families of Curves. Exact Equations -- § 4. Implicit First Order Differential Equations -- II: Theory of First Order Differential Equations -- § 5. Tools from Functional Analysis -- § 6. An Existence and Uniqueness Theorem -- § 7. The Peano Existence Theorem -- § 8. Complex Differential Equations. Power Series Expansions -- § 9. Upper and Lower Solutions. Maximal and Minimal Integrals -- III: First Order Systems. Equations of Higher Order -- § 10. The Initial Value Problem for a System of First Order -- § 11. Initial Value Problems for Equations of Higher Order -- § 12. Continuous Dependence of Solutions -- § 13. Dependence of Solutions on Initial Values and Parameters -- IV: Linear Differential Equations -- § 14. Linear Systems -- § 15. Homogeneous Linear Systems -- § 16. Inhomogeneous Systems -- § 17. Systems with Constant Coefficients -- § 18. Matrix Functions. Inhomogeneous Systems -- § 19. Linear Differential Equations of Order n -- § 20. Linear Equations of Order nwith Constant Coefficients -- V: Complex Linear Systems -- § 21. Homogeneous Linear Systems in the Regular Case -- § 22. Isolated Singularities -- § 23. Weakly Singular Points. Equations of Fuchsian Type -- § 24. Series Expansion of Solutions -- § 25. Second Order Linear Equations -- VI: Boundary Value and Eigenvalue Problems -- § 26. Boundary Value Problems -- § 27. The Sturm—Liouville Eigenvalue Problem -- § 28. Compact Self-Adjoint

Operators in Hilbert Space -- VII: Stability and Asymptotic Behavior -- § 29. Stability -- § 30. The Method of Lyapunov -- A. Topology -- B. Real Analysis -- C. C0111plex Analysis -- D. FunctionalAnalysis -- Solutions and Hints for Selected Exercises -- Literature -- Notation.

Sommario/riassunto

Develops the theory of initial-, boundary-, and eigenvalue problems, real and complex linear systems, asymptotic behavior and stability. Using novel approaches to many subjects, the book emphasizes differential inequalities and treats more advanced topics such as Caratheodory theory, nonlinear boundary value problems and radially symmetric elliptic problems. New proofs are given which use concepts and methods from functional analysis. Applications from mechanics, physics, and biology are included, and exercises, which range from routine to demanding, are dispersed throughout the text. Solutions for selected exercises are included at the end of the book. All required material from functional analysis is developed in the book and is accessible to students with a sound knowledge of calculus and familiarity with notions from linear algebra. This text would be an excellent choice for a course for beginning graduate or advanced undergraduate students.