

1. Record Nr.	UNINA9910861095903321
Autore	Chicone Carmen Charles
Titolo	Ordinary Differential Equations with Applications / / by Carmen Chicone
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2024
ISBN	3-031-51652-4
Edizione	[3rd ed. 2024.]
Descrizione fisica	1 online resource (xxii, 729 pages) : illustrations
Collana	Texts in Applied Mathematics, , 2196-9949 ; ; 34
Disciplina	515/.35
Soggetti	Mathematical analysis Dynamics System theory Mathematical physics Analysis Dynamical Systems Complex Systems Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Ordinary Differential Equations -- Linear Systems and Stability of Nonlinear Systems -- Applications -- Hyperbolic Theory -- Continuation of Periodic Solutions -- Homoclinic Orbits, Melnikov's Method, and Chaos -- Averaging -- Local Bifurcation.
Sommario/riassunto	This book, developed during 20 years of the author teaching differential equations courses at his home university, is designed to serve as a text for a graduate level course focused on the central theory of the subject with attention paid to applications and connections to other advanced topics in mathematics. Core theory includes local existence and uniqueness, the phase plane, Poincaré–Bendixson theory, Lyapunov and linearized stability, linear systems, Floquet theory, the Grobman–Hartman theorem, persistence of rest points and periodic orbits, the stable and center manifold theorems, and bifurcation theory. This edition includes expanded treatment of deterministic chaos, perturbation theory for periodic solutions, boundary value problems,

optimization, and a wide range of their applications. In addition, it contains a formulation and new proof of a theorem on instability of rest points in the presence of an eigenvalue with positive real part, and new proofs of differential inequalities and Lyapunov's center theorem. New sections present discussions of global bifurcation, the Crandall–Rabinowitz theorem, and Alekseev's formula. Of particular note is a new chapter on basic control theory, a discussion of optimal control, and a proof of a useful special case of the maximum principle. A key feature of earlier editions, a wide selection of original exercises, is respected in this edition with the inclusion of a wealth of new exercises. Reviews of the first edition: "As an applied mathematics text on linear and nonlinear equations, the book by Chicone is written with stimulating enthusiasm. It will certainly appeal to many students and researchers."—F. Verhulst, SIAM Review "The author writes lucidly and in an engaging conversational style. His book is wide-ranging in its subject matter, thorough in its presentation, and written at a generally high level of generality, detail, and rigor." —D. S. Shafer, Mathematical Reviews.
