

1. Record Nr.	UNINA9910483663403321
Autore	Akhmet Marat
Titolo	Dynamics with Chaos and Fractals // by Marat Akhmet, Mehmet Onur Fen, Ejaily Milad Alejaily
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-35854-2
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XIII, 226 p. 76 illus., 71 illus. in color.)
Collana	Nonlinear Systems and Complexity, , 2195-9994 ; ; 29
Disciplina	003.857
Soggetti	Mathematical physics Computational complexity Statistical physics Dynamics Ergodic theory Engineering mathematics Mathematical Applications in the Physical Sciences Complexity Applications of Nonlinear Dynamics and Chaos Theory Dynamical Systems and Ergodic Theory Engineering Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1. Introduction -- Chapter 2. The Unpredictable Point and Poincare Chaos -- Chapter 3. Unpredictability in Bebutov Dynamics -- Chapter 4. Non-linear Unpredictable Perturbations -- Chapter 5. Unpredictability in Topological Dynamics -- Chapter 6. Unpredictable Solutions of Hyperbolic Linear Equations -- Chapter 7. Strongly Unpredictable Solutions -- Chapter 8. Li-Yorke Chaos in Hybrid Systems on a Time Scale -- Chapter 9. Homoclinic and Heteroclinic Motions in Economic Models -- Chapter 10. Global Weather and Climate in the light of El Nino-Southern Oscillation -- Chapter 11. Fractals: Dynamics in the Geometry -- Chapter 12. Abstract Similarity, Fractals and Chaos.

The book is concerned with the concepts of chaos and fractals, which are within the scopes of dynamical systems, geometry, measure theory, topology, and numerical analysis during the last several decades. It is revealed that a special kind of Poisson stable point, which we call an unpredictable point, gives rise to the existence of chaos in the quasi-minimal set. This is the first time in the literature that the description of chaos is initiated from a single motion. Chaos is now placed on the line of oscillations, and therefore, it is a subject of study in the framework of the theories of dynamical systems and differential equations, as in this book. The techniques introduced in the book make it possible to develop continuous and discrete dynamics which admit fractals as points of trajectories as well as orbits themselves. To provide strong arguments for the genericity of chaos in the real and abstract universe, the concept of abstract similarity is suggested. The Book Stands as the first book presenting theoretical background on the unpredictable point and mapping of fractals Introduces the concepts of unpredictable functions, abstract self-similarity, and similarity map Discusses unpredictable solutions of quasilinear ordinary and functional differential equations Illustrates new ways to construct fractals based on the ideas of Fatou and Julia Examines unpredictability in ocean dynamics and neural networks, chaos in hybrid systems on a time scale, and homoclinic and heteroclinic motions in economic models .
