

1. Record Nr.	UNINA9910366620803321
Autore	Akhmet Marat
Titolo	Almost Periodicity, Chaos, and Asymptotic Equivalence // by Marat Akhmet
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-20572-X
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XVII, 360 p. 26 illus., 25 illus. in color.)
Collana	Nonlinear Systems and Complexity, , 2195-9994 ; ; 27
Disciplina	519 515.5
Soggetti	Applied mathematics Engineering mathematics Statistical physics Differential equations Neural networks (Computer science) Mathematical and Computational Engineering Applications of Nonlinear Dynamics and Chaos Theory Ordinary Differential Equations Mathematical Models of Cognitive Processes and Neural Networks
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Generalities for Impulsive systems -- Chapter 3. Discontinuous Almost Periodic Functions -- Chapter 4. Discontinuous Almost Periodic Solutions -- Chapter 5. Bohr and Bochner Discontinuities -- Chapter 6. Exponentially Dichotomous Linear EPCAG -- Chapter 7. Functional Response on Piecewise Constant Argument -- Chapter 8. SICNN with Functional REsponse on PCA -- Chapter 9. Differential Equations on Time Scales -- Chapter 10. Almost Periodicity in Chaos -- Chapter 11. Homoclinic Chaos and Almost Periodicity -- Chapter 12. SICNN with Chaotic/Almost Periodic Post Synaptic Currents -- Chapter 13. Asymptomatic Equivalence and Almost Periodic Solutions -- Chapter 14. Asymptomatic Equivalence of Hybrid Systems.

The central subject of this book is Almost Periodic Oscillations, the most common oscillations in applications and the most intricate for mathematical analysis. Prof. Akhmet's lucid and rigorous examination proves these oscillations are a "regular" component of chaotic attractors. The book focuses on almost periodic functions, first of all, as Stable (asymptotically) solutions of differential equations of different types, presumably discontinuous; and, secondly, as non-isolated oscillations in chaotic sets. Finally, the author proves the existence of Almost Periodic Oscillations (asymptotic and bi-asymptotic) by asymptotic equivalence between systems. The book brings readers' attention to contemporary methods for considering oscillations as well as to methods with strong potential for study of chaos in the future. Providing three powerful instruments for mathematical research of oscillations where dynamics are observable and applied, the book is ideal for engineers as well as specialists in electronics, computer sciences, robotics, neural networks, artificial networks, and biology. Distinctively combines results and methods of the theory of differential equations with thorough investigation of chaotic dynamics with almost periodic ingredients; Provides all necessary mathematical basics in their most developed form, negating the need for any additional sources for readers to start work in the area; Presents a unique method of investigation of discontinuous almost periodic solutions in its unified form, employed to differential equations with different types of discontinuity; Develops the equivalence method to its ultimate effective state such that most important theoretical problems and practical applications can be analyzed by the method.
