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Titolo	Dynamical Phase Transitions in Chaotic Systems / / by Edson Denis Leonel
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ISBN	981-9922-44-5
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (83 pages)
Collana	Nonlinear Physical Science, , 1867-8459
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Soggetti	Dynamical systems Mathematical analysis Condensed matter Dynamical Systems Scale Invariance Phase Transitions and Multiphase Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Posing the problems -- A Hamiltonian and a mapping -- A phenomenological description for chaotic diffusion -- A semi phenomenological description for chaotic diffusion -- A solution for the diffusion equation -- Characterization of a continuous phase transition in an area preserving map -- Scaling invariance for chaotic diffusion in a dissipative standard mapping -- Characterization of a transition from limited to unlimited diffusion -- Billiards with moving boundary -- Suppression of Fermi acceleration in oval billiard -- Suppressing the unlimited energy gain: evidences of a phase transition.
Sommario/riassunto	This book discusses some scaling properties and characterizes two-phase transitions for chaotic dynamics in nonlinear systems described by mappings. The chaotic dynamics is determined by the unpredictability of the time evolution of two very close initial conditions in the phase space. It yields in an exponential divergence from each other as time passes. The chaotic diffusion is investigated, leading to a scaling invariance, a characteristic of a continuous phase transition. Two different types of transitions are considered in the book. One of them considers a transition from integrability to non-integrability

observed in a two-dimensional, nonlinear, and area-preserving mapping, hence a conservative dynamics, in the variables action and angle. The other transition considers too the dynamics given by the use of nonlinear mappings and describes a suppression of the unlimited chaotic diffusion for a dissipative standard mapping and an equivalent transition in the suppression of Fermi acceleration in time-dependent billiards. This book allows the readers to understand some of the applicability of scaling theory to phase transitions and other critical dynamics commonly observed in nonlinear systems. That includes a transition from integrability to non-integrability and a transition from limited to unlimited diffusion, and that may also be applied to diffusion in energy, hence in Fermi acceleration. The latter is a hot topic investigated in billiard dynamics that led to many important publications in the last few years. It is a good reference book for senior- or graduate-level students or researchers in dynamical systems and control engineering, mathematics, physics, mechanical and electrical engineering.