

1. Record Nr.	UNINA9911019686303321
Titolo	Reviews of nonlinear dynamics and complexity . Volume 3 // edited by Heinz Georg Schuster
Pubbl/distr/stampa	Weinheim, : Wiley-VCH [Chichester, : John Wiley, distributor], c2010
ISBN	1-282-71239-X 9786612712395 3-527-63096-1 3-527-63097-X
Descrizione fisica	1 online resource (261 p.)
Collana	Annual Reviews of Nonlinear Dynamics and Complexity (VCH) ; ; v.3
Altri autori (Persone)	SchusterHeinz Georg <1943->
Disciplina	003.75
Soggetti	Nonlinear theories Computational complexity
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Reviews of Nonlinear Dynamics and Complexity; Contents; Preface; List of Contributors; 1 The Chaos Computing Paradigm; 1.1 Brief History of Computers; 1.2 The Conceptualization, Foundations, Design and Implementation of Current Computer Architectures; 1.3 Limits of Binary Computers and Alternative Approaches to Computation: What Lies Beyond Moore's Law?; 1.4 Exploiting Nonlinear Dynamics for Computations; 1.5 General Concept; 1.6 Continuous-Time Nonlinear System; 1.7 Proof-of-Principle Experiments; 1.7.1 Discrete-Time Nonlinear System; 1.7.2 Continuous-Time Nonlinear System 1.8 Logic from Nonlinear Evolution: Dynamical Logic Outputs1.8.1 Implementation of Half- and Full-Adder Operations; 1.9 Exploiting Nonlinear Dynamics to Store and Process Information; 1.9.1 Encoding Information; 1.9.2 Processing Information; 1.9.3 Representative Example; 1.9.4 Implementation of the Search Method with Josephson Junctions; 1.9.5 Discussions; 1.10 VLSI Implementation of Chaotic Computing Architectures: Proof of Concept; 1.11 Conclusions; References; 2 How Does God Play Dice?; 2.1 Introduction; 2.2 Model; 2.2.1 Bounce Map with Dissipation

2.3 Phase Space Structure: Poincare Section; 2.4 Orientation Flip Diagrams; 2.5 Bounce Diagrams; 2.6 Summary and Conclusions; 2.7 Acknowledgments; References; 3 Phase Reduction of Stochastic Limit-Cycle Oscillators; 3.1 Introduction; 3.2 Phase Description of Oscillator; 3.3 Oscillator with White Gaussian Noise; 3.3.1 Stochastic Phase Equation; 3.3.2 Derivation; 3.3.3 Steady Phase Distribution and Frequency; 3.3.4 Numerical Examples; 3.4 Oscillator with Ornstein-Uhlenbeck Noise; 3.4.1 Generalized Stochastic Phase Equation; 3.4.2 Derivation; 3.4.3 Steady Phase Distribution and Frequency; 3.4.4 Numerical Examples; 3.4.5 Phase Equation in Some Limits; 3.5 Noise effect on entrainment; 3.5.1 Periodically Driven Oscillator with White Gaussian Noise; 3.5.2 Periodically Driven Oscillator with Ornstein-Uhlenbeck Noise; 3.5.3 Conjecture; 3.6 Summary; References; 4 Complex Systems, numbers and Number Theory; 4.1 A Statistical Pattern in the Prime Number Sequence; 4.1.1 Benford's Law and Generalized Benford's Law; 4.1.2 Are the First-Digit Frequencies of Prime Numbers Benford Distributed?; 4.1.3 Prime Number Theorem Versus Size-Dependent Generalized Benford's Law; 4.1.4 The Primes Counting Function  $L(N)$ ; 4.1.5 Remarks; 4.2 Phase Transition in Numbers: the Stochastic Prime Number Generator; 4.2.1 Phase Transition; 4.2.1.1 Network Image and Order Parameter; 4.2.1.2 Annealed Approximation; 4.2.1.3 Data Collapse; 4.2.2 Computational Complexity; 4.2.2.1 Worst-Case Classification; 4.2.2.2 Easy-Hard-Easy Pattern; 4.2.2.3 Average-Case Classification; 4.3 Self-Organized Criticality in Number Systems: Topology Induces Criticality; 4.3.1 The Division Model; 4.3.2 Division Dynamics and SOC; 4.3.3 Analytical Developments: Statistical Physics Versus Number Theory; 4.3.4 A More General Class of Models

## Sommario/riassunto

Written in a style that breaks the barriers between the disciplines, this monograph enables researchers from life science, physics, engineering, or chemistry to access the most recent results in a common language. The resulting review character of this project sets it apart from specialized journals, and allows each volume to respond quickly to new developments. This third volume contains new topics ranging from chaotic computing, via random dice tossing and stochastic limit-cycle oscillators, to a number theoretic example of self-organized criticality, wave localization in complex networks