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	Altri autori (Persone)	CaponettoR <1966-> (Riccardo)
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		FrascaMattia
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	Nota di contenuto	Preface; Contributors; List of People Involved in the FIRB Project; Contents; 1. The CNN Paradigm for Complexity; 1.1 Introduction; 1.2 The 3D-CNN Model; 1.3 E3: An Universal Emulator for Complex Systems; 1.4 Emergence of Forms in 3D-CNNs; 1.4.1 Initial conditions; 1.4.2 3D waves in homogeneous and unhomogeneous media; 1.4.3 Chua's circuit; 1.4.4 Lorenz system; 1.4.5 Rossler system; 1.4.6 FitzHugh-Nagumo neuron model; 1.4.7 Hindmarsh-Rose neuron model; 1.4.8 Inferior-Olive neuronmodel; 1.4.9 Izhikevich neuronmodel; 1.4.10 Neuron model exhibiting homoclinic chaos; 1.5 Conclusions
		2. Emergent Phenomena in Neuroscience2.1 Introductory Material: Neurons and Models; 2.1.1 Models of excitability; 2.1.2 The Hodgkin-Huxley model; 2.1.3 The FitzHugh-Nagumo model; 2.1.4 Class I and

class II excitability; 2.1.5 Other neuronmodels; 2.2 Electronic Implementation of NeuronModels; 2.2.1 Implementation of single cell neuron dynamics; 2.2.2 Implementation of systems with many neurons; 2.3 Local Activity Theory for Systems of IO Neurons; 2.3.1 The theory of local activity for one-port and two-port systems
2.3.2 The local activity and the edge of chaos regions of the inferior olive neuron2.4 Simulation of IO Systems: Emerging Results; 2.4.1 The paradigm of local active wave computation for image processing; 2.4.2 Local active wave computation based paradigm: 3D-shape processing; 2.5 Networks of HR Neurons; 2.5.1 The neural model; 2.5.2 Parameters for dynamical analysis; 2.5.3 Dynamical effects of topology on synchronization; 2.6 Neurons in Presence of Noise; 2.7 Conclusions; 3. Frequency Analysis and Identification in Atomic Force Microscopy; 3.1 Introduction; 3.2 AFM Modeling
3.2.1 Piecewise interaction force3.2.2 Lennard Jones-like interaction force; 3.3 Frequency Analysis via Harmonic Balance; 3.3.1 Piecewise interaction model analysis; 3.3.2 Lennard Jones-like hysteretic model analysis; 3.4 Identification of the Tip-Sample Force Model; 3.4.1 Identification method; 3.4.2 Experimental results; 3.5 Conclusions; References; 4. Control and Parameter Estimation of Systems with Low-Dimensional Chaos - The Role of Peak-to-Peak Dynamics; 4.1 Introduction; 4.2 Peak-to-Peak Dynamics; 4.3 Control System Design; 4.3.1 PPD modeling and control
4.3.2 The impact of noise and sampling frequency4.3.3 PPD reconstruction; 4.4 Parameter Estimation; 4.4.1 Derivation of the "empirical PPP"; 4.4.2 Interpolation of the "empirical PPP"; 4.4.3 Optimization; 4.4.4 Example of application; 4.5 Concluding Remarks; References; 5. Synchronization of Complex Networks; 5.1 Introduction; 5.2 Synchronization of Interacting Oscillators; 5.3 From Local to Long-Range Connections; 5.4 The Master Stability Function; 5.4.1 The case of continuous time systems; 5.4.2 The Master stability function for coupled maps
5.5 Key Elements for the Assessing of Synchronizability

Sommario/riassunto	This book focuses on the research topics investigated during the three-year research project funded by the Italian Ministero dell'Istruzione, dell'Universita e della Ricerca (MIUR: Ministry of Education, University and Research) under the FIRB project RBNE01CW3M. With the aim of introducing newer perspectives of the research on complexity, the final results of the project are presented after a general introduction to the subject. The book is intended to provide researchers, PhD students, and people involved in research projects in companies with the basic fundamentals of complex systems and th