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Roska; 1. Introduction
2. Using Cellular Dynamics and Nonlinear Dynamical Circuits for Computation - A Prehistory3. The Standard CNN (Cellular Neural/Nonlinear Network) as the Practically Feasible Prototype Solution and Related Stability Issues; 4. Inventing the Stored Programmable Spatial-temporal Computer: The CNN Universal Machine (CNN-UM) and the Cellular Wave Computer; 5. Making the First Silicon Visual Microprocessors and its Computational Infrastructure - Other Physical Implementations; 6. Biological Relevance and Bio-inspiration
7. Some Fundamental Theorems - More than PDE, Equivalence to Fully-connectedness, Analytic Theory of CA, Godel Incompleteness8. Prototype Spatial-temporal CNN Algorithms and Novel Applications; 9. Physical and Virtual Cellular Machines with Kilo- and Mega-processor Chips and Related Topographic Algorithms; 10. Conclusions and Major New Challenges; Acknowledgment; References; 5. Contributions of CNN to Bio-robotics and Brain Science Paolo Arena and Luca Patane; 1. Introduction; 2. CNN-based CPGs for Locomotion Control in Bio-robots; 2.1. Basis of locomotion
2.2. The CNN neuron model for CPG: a slow-fast controllable limit cycle2.3. CPG in a reaction-diffusion CNN structure; 2.4. CPG in amulti-template-CNN; 3. A Brain for the Body:A CNN-based Spatio-temporal Approach; 3.1. Control architecture; 3.1.1. Sensory block; 3.1.2. Basic behaviors; 3.1.3. Representation layer; 3.1.4. Preprocessing block; 3.1.5. Perceptual core; 3.1.6. Selection network; 3.1.7. Motivation layer and learning process; 3.2. Simulation results; 3.2.1. Learning phase; 3.2.2. Testing phase; 3.2.3. Experimental results; 4. A Note on Winnerless Competition in CNNs; 5. Conclusions Acknowledgement

Sommario/riassunto

This invaluable book is a unique collection of tributes to outstanding discoveries pioneered by Leon Chua in nonlinear circuits, cellular neural networks, and chaos. It is comprised of three parts. The first - cellular nonlinear networks, nonlinear circuits and cellular automata - deals with Chua's Lagrangian circuits, cellular wave computers, bio-inspired robotics and neuro-morphic architectures, toroidal chaos, synaptic cellular automata, history of Chua's circuits, cardiac arrhythmias, local activity principle, symmetry breaking and complexity, bifurcation trees, and Chua's views on nonline