1. Record Nr. UNINA9910779987003321 Autore Chua Leon O. <1936-> Titolo A nonlinear dynamics perspective of Wolfram's new kind of science. Volume VI / / Leon O. Chua, University of California at Berkeley, USA Pubbl/distr/stampa Singapore: Hackensack, N.J., World Scientific, 2013 New Jersey:,: World Scientific,, [2013] 2013 **ISBN** 981-4460-88-5 Descrizione fisica 1 online resource (x, 568 pages): illustrations (chiefly color) Collana Nonlinear dynamics perspective of Wolfram's new kind of science;; v. World Scientific series on nonlinear science. Series A;; v. 85 511.3/5 Disciplina Soggetti Cellular automata Computational complexity **Dynamics** Nonlinear theories 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 Dedication; Preface; CONTENTS; Volume VI; Chapter 1. Bernoulli -Shift Rules; 1. Introduction; 1.1. Brief notes on Bernoulli -shift rules; 2. Basin Tree Diagrams, Omega-Limit Orbits and Space-Time Patterns; 2.1. Basin tree diagrams and portraits of the -limit orbits; 2.2. Spacetime patterns of Bernoulli rules using the super string as initial string; 3. Robust and Nonrobust -Limit Orbits of Rules from Group 4; 3.1. Robust -limit orbits of rules from Group 4; 3.2. Nonrobust -limit orbits of rules from Group 4; 4. Concluding Remarks; Chapter 2. More Bernoulli -Shift Rules 1. Introduction2. Bernoulli -Shift Rules; 2.1. General aspects of the Bernoulli -shift rules; 2.2. Basin-tree diagrams and portraits of their -limit orbits; 2.3. Space-time patterns of Bernoulli rules using the superstring as initial state; 3. Robust and Nonrobust -Limit Orbits of Rules from Group 4; 3.1. Robust -limit orbits of rules from Group 4;

3.2. Non-robust -limit orbits of rules from Group 4; 3.3. Rules with multiple robust -limit orbits; 4. Summary of Elementary 1D Cellular

Automata; 4.1. Boolean cubes, complexity index, and threshold of complexity

4.2. Globally and quasi-globally equivalent rules4.3. Rotations and symmetries; 4.4. Classification of the local rules; 4.5. Fractality and quasi-ergodicity; 4.6. Isles of Eden and Omega-limit orbits; 5. Concluding Remarks; Chapter 3. Remembrance of Things Past; Vignettes from Volume I; Vignettes from Volume II; Vignettes from Volume IV; Vignettes from Volume V; Vignettes from Volume V; Vignettes from Volume VI; Vignettes of Metaphors from Biology, Cosmology, Physics, etc.; Vignettes of 256 Boolean Cubes; References; Appendices

Appendix I: Correspondence between Chapters from Edited Book and Papers from IJBC JournalAppendix II: Useful and Generic Tables and Figures; Appendix III: Pages where 16 Exquisite Elementary CA Rules are Cited, Discussed, or Characterized; Appendix IV: Contents of Volumes I-VI; Index

Sommario/riassunto

This invaluable volume ends the quest to uncover the secret recipes for predicting the long-term evolution of a ring of identical elementary cells where the binary state of each cell during each generation of an attractor (i.e. after the transients had disappeared) is determined uniquely by the state of its left and right neighbors in the previous generation, as decreed by one of 256 truth tables. As befitting the contents aimed at school children, it was found pedagogically appealing to code each truth table by coloring each of the 8 vertices of a cubical graph in red (for binary state 1), or