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Nota di contenuto	Contents; Preface; Technical Contributions; 1. On Random and Hard-to-Describe Numbers Charles H. Bennett; 1. Berry's Paradox and the Unprovability of Randomness; 2. The Search for a "Random" Real Number; References; 2. Computing Beyond Classical Logic: SVD Computation in Nonassociative Dickson Algebras Francoise Chaitin-Chatelin; 2.1. Introduction; 2.2. Nonassociativity of multiplication; 2.3. Nonassociative Dickson algebras; 2.3.1. Presentation of Dickson's doubling process; 2.3.2. Alternative vectors in $A_k, k \geq 4$; 2.3.3. The splitting $A_k = CDC; 1 \ D_k, k \geq 2$ 2.4. SVD computation in D_k and $A_k, k \geq 4$. 2.4.1. $c \in D_k$ is doubly pure, $k \geq 4$.; 2.4.2. Deriving the SVD of a in A_k from that of the tail c in D_k , for $k \geq 4$; 2.4.3. Nonclassical derivation from c to $a, k \geq 3$; 2.5. Is the nonclassical SVD derivation absurd?; 2.5.1. The conventional analysis; 2.5.2. Induction and nonclassical singular values; 2.6. Conclusion; Acknowledgement; References; 3. Janus-Faced Physics: On Hilbert's 6th Problem N. C. A. da Costa and F. A. Doria; 3.1. Prologue; 3.2. Hilbert's 6th Problem; 3.3. A review of axiomatization techniques 3.4. Structures, species of structures, models 3.5. Axiomatization in

mathematics; 3.6. Suppes predicates for classical field theories in physics; 3.7. Generalized incompleteness; 3.8. Higher degrees; 3.9. The function and the arithmetical hierarchy; 3.10. First applications: mechanics and chaos theory; 3.11. Janus-faced physics; Acknowledgments; References; 4. The Implications of a Cosmological Information Bound for Complexity, Quantum Information and the Nature of Physical Law P. C. W. Davies; 4.1. What are the laws of physics?; 4.2. Laws as software; 4.3. The quantum vacuum 4.4. Quantum information processing 4.5. Unfinished business; Acknowledgments; Footnotes; 5. What Is a Computation? Martin Davis; The Turing - Post Language; Codes for Turing - Post Programs; The Universal Program; The Halting Problem; Other Unsolvable Problems; Undecidable Statements; Complexity and Randomness; Unsolvability of Halting Problem; An Unsolvable Word Problem; 6. On the Kolmogorov-Chaitin Complexity for Short Sequences Jean-Paul Delahaye and Hector Zenil; References; 7. Circuit Universality of Two Dimensional Cellular Automata: A Review A. Gajardo and E. Goles; 7.1. Introduction 7.2. Computing through signals 7.2.1. A three states CA by Banks; 7.3. CA over a hexagonal grid and three states; 7.4. Life automata; 7.4.1. Game of life; 7.4.2. Life without death; 7.5. Reversible models; 7.6. Sandpiles; 7.7. Conclusions; Acknowledgments; References; 8. Chaitin's Graph Coloring Algorithm James Goodman; References; 9. A Berry-type Paradox Gabriele Lolli; References; 10. in Number Theory Toby Ord and Tien D. Kieu; 10.1. Recursive Enumerability, Algorithmic Randomness and ; 10.2. Diophantine Equations and Hilbert's Tenth Problem 10.3. Expressing Omega Through Diophantine Equations

Sommario/riassunto

The book is a collection of papers written by a selection of eminent authors from around the world in honour of Gregory Chaitin's 60th birthday. This is a unique volume including technical contributions, philosophical papers and essays. *Sample Chapter(s)*
Chapter 1: On Random and Hard-to-Describe Numbers (902 KB)
Contents:

- On Random and Hard-to-Describe Numbers (C H Bennett)
- The Implications of a Cosmological Information Bound for Complexity, Quantum Information and the Nature of Physical Law (P C W Davies)
- What is a Computation? <
