



Advances in Unconventional Computing : Volume 1: Theory /

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The unconventional computing is a niche for interdisciplinary science, cross-bred of computer science, physics, mathematics, chemistry, electronic engineering, biology, material science and nanotechnology. The aims of this book are to uncover and exploit principles and mechanisms of information processing in and functional properties of physical, chemical and living systems to develop efficient algorithms, design optimal architectures and manufacture working prototypes of future and emergent computing devices. This first volume presents theoretical foundations of the future and emergent computing paradigms and architectures. The topics covered are computability, (non-)universality and complexity of computation; physics of computation, analog and quantum computing; reversible and asynchronous devices; cellular automata and other mathematical machines; P-systems and cellular computing; infinity and spatial computation; chemical and reservoir computing. The book is the encyclopedia, the first ever complete authoritative account, of the theoretical and experimental findings in the unconventional computing written by the world leaders in the field. All chapters are self-contains, no specialist background is required to appreciate ideas, findings, constructs and designs presented. This treatise in unconventional computing appeals to readers from all walks of life, from high-school pupils to university professors, from mathematicians, computers scientists and engineers to chemists and biologists

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