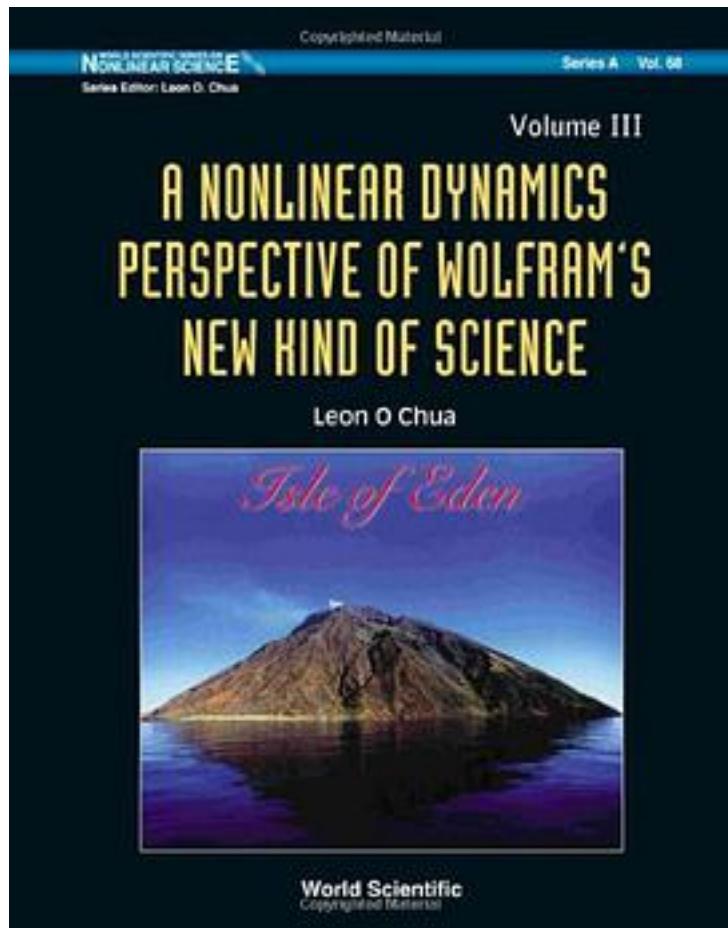


# A Nonlinear Dynamics Perspective of Wolfram's New Kind of Science



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出版者:

出版时间:2009-8

装帧:

isbn:9789812837936

Volume III continues the author's quest for developing a pedagogical, self-contained, yet rigorous analytical theory of 1-D cellular automata via a nonlinear dynamics

perspective. Using carefully conceived and illuminating color graphics, the global dynamical behaviors of the 50 (out of 256) local rules that have not yet been covered in Volumes I and II are exposed via their stunningly revealing basin tree diagrams. The Bernoulli -shift dynamics discovered in Volume II is generalized to hold for all 50 (or 18 globally equivalent) local rules via complex and hyper Bernoulli wave dynamics.

Explicit global state transition formulas derived for rules 60, 90, 105, and 150 reveal a new scale-free phenomenon. The most surprising new result unveiled in this volume is the Isle of Eden found hidden in most (almost 90%) of the 256 local rules. Readers are challenged to hunt for long-period, isolated Isles of Eden. These are rare gems waiting to be discovered.

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