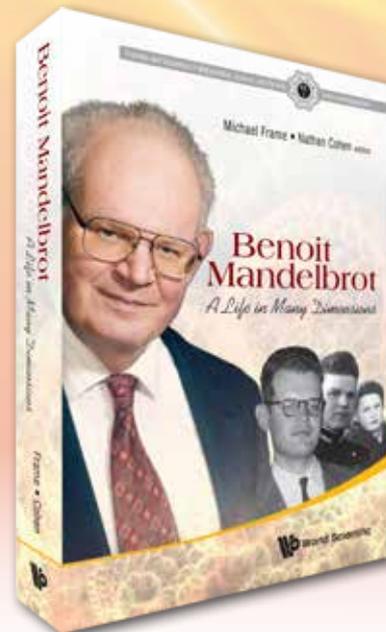
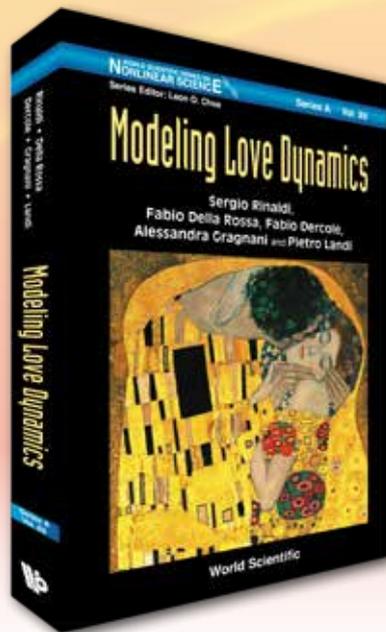
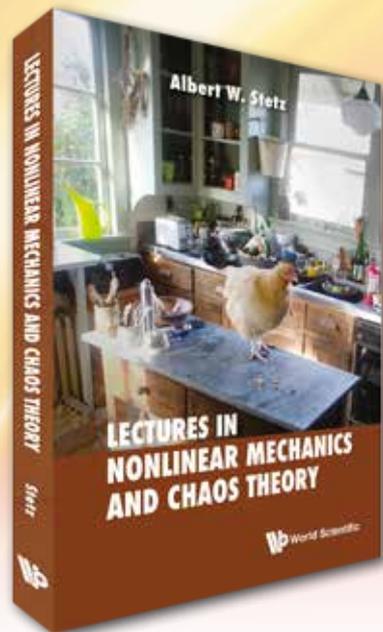


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# Nonlinear Science, Chaos and Dynamical Systems 2017



## Lectures on Nonlinear Mechanics and Chaos Theory

by **Albert W Stetz** (Oregon State University, USA)

This elegant book presents a rigorous introduction to the theory of nonlinear mechanics and chaos. It turns out that many simple mechanical systems suffer from a peculiar malady. They are deterministic in the sense that their motion can be described with partial differential equations, but these equations have no proper solutions and the behavior they describe can be wildly unpredictable. This is implicit in Newtonian physics, and although it was analyzed in the pioneering work of Poincaré in the 19th century, its full significance has only been realized since the advent of modern computing. It is written in the easy conversational style of a great teacher. It features numerous computer-drawn figures illustrating the behavior of nonlinear systems. It also contains homework exercises and a selection of more detailed computational projects.

**Readership:** Students who want to learn the subject of nonlinear mechanics and chaos theory from first principles.

150pp	Aug 2016	
978-981-3141-35-3	US\$70	£50
978-981-3143-02-9(pbk)	US\$35	£25

World Scientific Series on Nonlinear Science Series A - Volume 89

## Modeling Love Dynamics

by **Sergio Rinaldi** (Politecnico di Milano, Italy & International Institute for Applied Systems Analysis, Austria), **Fabio Della Rossa**, **Fabio Dercole**, **Alessandra Gragnani** (Politecnico di Milano, Italy) & **Pietro Landi** (Stellenbosch University, South Africa)

*"In many respects the book evolves around the two most powerful products of the human mind: art and science. Clearly, the arts are superior when it comes to capturing the depth of love affairs. Yet, the bare bones of the drivers of stable love, transient affairs and neurotic dynamics are captured powerfully by the disarmingly simple math. What topic would be better suited to seduce a broad audience to play with equations?"*

**A View from the Bridge: Nature's Books and Arts Blog**

**Readership:** Undergraduate and graduate students, researchers and academics in applied mathematics; systems analysts, theoretical psychologists and social scientists.

256pp	Dec 2015	
978-981-4696-31-9	US\$114	£82
978-981-4696-32-6(ebook)	US\$148	£107

Fractals and Dynamics in Mathematics, Science, and the Arts: Theory and Applications — **Vol. 1 Benoit Mandelbrot**

A Life in Many Dimensions  
 edited by **Michael Frame** (Yale) & **Nathan Cohen** (Fractal Antenna Systems, Inc., USA)

*"What makes this book unique is that many of the articles spend a lot of time talking about Mandelbrot's personal involvement in these areas. The authors often offer personal glimpses of how their interactions with him led to their advances. This book offers a good overview of the many different areas that Mandelbrot worked in. Many of the articles are aimed at a very wide audience and can be understood by all."*

**Mathematical Reviews Clippings**

**Readership:** People interested in the life work of Benoit Mandelbrot. While the technical articles will be accessible mainly to scientists, the range of chapters provides material of interest to a wide range of readers. The audience range from the general public for some parts, through high school and college teachers, to research scientists.

580pp	May 2015	
978-981-4366-06-9	US\$186	£134
978-981-4366-07-6(ebook)	US\$242	£174

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[www.worldscientific.com/page/nonlinearsci](http://www.worldscientific.com/page/nonlinearsci)

Exploring Complexity - Volume 2

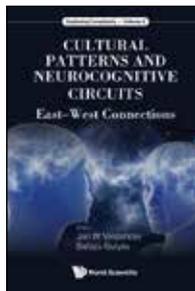
### Cultural Patterns and Neurocognitive Circuits East-West Connections

edited by **Jan Vasbinder** & **Balázs Gulyás**  
(NTU, Singapore)

The contents of this book focus on cultural patterns and cognitive patterns in the East and West, with special regard to those patterns which are determined by our natural-genetic endowments in contrast to those patterns which are influenced by our cultural ("East-West") influences, and within this context a unique flavour is given to the "good life" aspects of adapting to this global community.

**Readership:** Students and researchers.

**216pp** **Nov 2016**  
**978-981-3147-48-5** **US\$98** **£85**



Series on Complexity Science - Volume 4

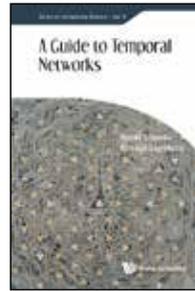
### A Guide to Temporal Networks

by **Naoki Masuda** (University of Bristol, UK),  
**Renaud Lambiotte** (University of Namur, Belgium)

This book presents recent theoretical and modelling progress in the emerging field of temporally varying networks, and provides connections between different areas of knowledge required to address this multi-disciplinary subject. After an introduction to key concepts, readers are guided through a coherent selection of mathematical and computational tools for network dynamics.

**Readership:** Students, professionals and researchers in applied mathematics, physics and computer science, with applications in others including social sciences, neuroscience and biology.

**250pp** **Sep 2016**  
**978-1-78634-114-3** **US\$98** **£71**  
**978-1-78634-115-0(ebook)** **US\$127** **£92**



### Dynamics of Mechatronics Systems

Modeling, Simulation, Control, Optimization and Experimental Investigations

by **Jan Awrejcewicz**, **Donat Lewandowski** & **Paweł Olejnik** (Lodz University of Technology, Poland)

This book describes the interplay of mechanics, electronics, electrotechnics, automation and biomechanics. It provides a broad overview of mechatronics systems ranging from modeling and dimensional analysis, and an overview of magnetic, electromagnetic and piezo-electric phenomena. It also includes the investigation of the pneumo-fluid-mechanical, as well as electrohydraulic servo systems, modeling of dynamics of an atom/particle embedded in the magnetic field, integrity aspects of the Maxwell's equations, the selected optimization problems of angular velocity control of a DC motor subjected to chaotic disturbances with and without stick-slip dynamics, and the analysis of a human chest adjacent to the elastic backrest aimed at controlling force to minimize relative compression of the chest employing the LQR.

**Readership:** Advanced undergraduate and graduate students, researchers and academics.

**356pp** **Oct 2016**  
**978-981-3146-54-9** **US\$118** **£98**



### Problems and Solutions

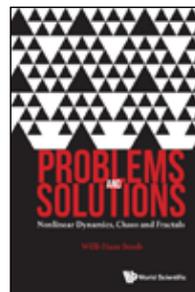
Nonlinear Dynamics, Chaos and Fractals  
by **Willi-Hans Steeb**

(University of Johannesburg, South Africa)

Each chapter contains an introduction with suitable definitions and explanations to tackle the problems. Besides the solved problems, supplementary problems are also added. The material is self-contained, and the topics range in difficulty from elementary to advanced. Students can learn important principles and strategies required for problem solving. Lecturers can also either use it as a supplement or text, since concepts and techniques are developed in the problems.

**Readership:** Graduate students.

**250pp** **May 2016**  
**978-981-3109-92-6** **US\$68** **£45**  
**978-981-3140-87-5(pbk)** **US\$35** **£23**



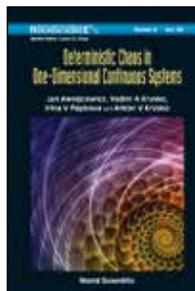
### Deterministic Chaos in One-Dimensional Continuous Systems

by **Jan Awrejcewicz** (Lodz University of Technology, Poland), **Vadim A Krysko**, **Irina V Papkova** (Saratov State Technical University, Russia) & **Anton V Krysko** (Saratov State Technical University, Russia & Cybernetic Institute, National Research Tomsk Polytechnic University, Russia)

This book focuses on the computational analysis of nonlinear vibrations of structural members (beams, plates, panels, shells), where the studied dynamical problems can be reduced to the consideration of one spatial variable and time.

**Readership:** Post-graduate and doctoral students, applied mathematicians, physicists, mechanical and civil engineers.

**576pp** **May 2016**  
**978-981-4719-69-8** **US\$174** **£144**



Nonlinear Time Series and Chaos - Volume 5

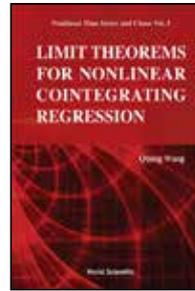
### Limit Theorems for Nonlinear Cointegrating Regression

by **Qiyang Wang** (The University of Sydney, Australia)

This book provides the limit theorems that can be used in the development of nonlinear cointegrating regression. The core context of this book comes from the author and his collaborator's current researches in past years, which is wide enough to cover the knowledge bases in nonlinear cointegrating regression.

**Readership:** Graduate students and researchers.

**300pp** **Nov 2015**  
**978-981-4675-62-8** **US\$118** **£85**  
**978-981-4675-63-5(ebook)** **US\$153** **£111**



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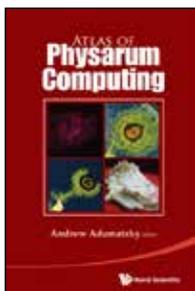
### Atlas of Physarum Computing

edited by **Andrew Adamatzky** (*University of the West of England, UK*)

The slime mould *Physarum polycephalum* behaves as an intelligent nonlinear spatially extended active medium encapsulated in an elastic membrane. The cell optimises its growth patterns in configurations of attractants and repellents. This behaviour is interpreted as computation. Numerous prototypes of slime mould computers were designed to solve problems of computational geometry, graphs and transport networks and to implement universal computing circuits. This atlas is unique in providing the depth and breadth of knowledge in harnessing behaviour of the slime mould to perform computation. It will help readers to understand how exploitation of biological processes has sparked new ideas and spurred progress in many fields of science and engineering.

**Readership:** Students and researchers interested in biological processes and computing.

**128pp** **May 2015**  
**978-981-4675-31-4** **US\$90** **£65**  
**978-981-4675-32-1(ebook)** **US\$117** **£85**



### Chaos, Information Processing and Paradoxical Games

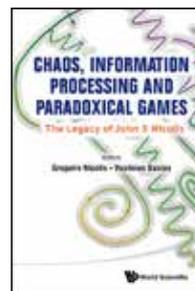
The Legacy of John S Nicolis

edited by **Gregoire Nicolis & Vasileios Basios** (*University of Brussels, Belgium*)

This main thesis of this book is that chaos and complexity are the basic ingredients allowing systems composed of interesting subunits to generate and process information and communicate in a meaningful way. Biological, cognitive, physical, engineering and societal systems are approached from a unifying point of view, both analytically and by numerical simulation, using methods of nonlinear dynamics and probability theory.

**Readership:** Graduate students, researchers, and academics from various fields.

**476pp** **Jan 2015**  
**978-981-4602-12-9** **US\$148** **£98**  
**978-981-4602-13-6(ebook)** **US\$192** **£127**



#### Textbook

Advanced Series in Nonlinear Dynamics — Vol. 27

### Simulation and Control of Chaotic Nonequilibrium Systems

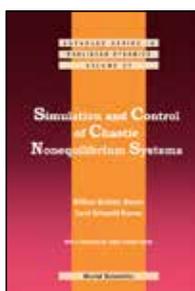
With a Foreword by Julien Clinton Sprott

by **William Graham Hoover & Carol Griswold Hoover** (*UC Davis*)

This book aims to provide a lively working knowledge of the thermodynamic control of microscopic simulations, while summarizing the historical development of the subject, along with some personal reminiscences. Many computational examples are described so that they are well-suited to learning by doing. The contents enhance the current understanding of the reversibility paradox.

**Readership:** Advanced undergraduates and researchers in physics, computation and irreversible thermodynamics.

**324pp** **Apr 2015**  
**978-981-4656-82-5** **US\$78** **£51**



#### Textbook

### The Nonlinear Workbook (6th Edition)

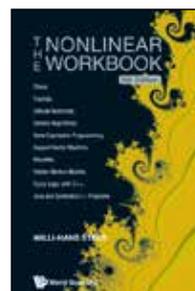
Chaos, Fractals, Cellular Automata, Genetic Algorithms, Gene Expression Programming, Support Vector Machine, Wavelets, Hidden Markov Models, Fuzzy Logic with C++, Java and SymbolicC++ Programs

by **Willi-Hans Steeb** (*University of Johannesburg, South Africa*)

This book provides a comprehensive treatment of all techniques in nonlinear dynamics together with C++, Java and SymbolicC++ implementations. It covers theoretical aspects and provides practical tools. More than 100 worked out examples and 160 ready to run programs are included.

**Readership:** Students and researchers in mathematics, physics, and computer science.

**684pp** **Jan 2015**  
**978-981-4583-46-6** **US\$110** **£73**  
**978-981-4583-47-3(pbk)** **US\$58** **£38**



Series on Stability, Vibration and Control of Systems, Series A — Vol. 20

### Complexity and Control

Towards a Rigorous Behavioral Theory of Complex Dynamical Systems

by **Vladimir G Ivancevic & Darryn J Reid**

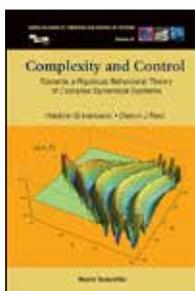
(*Defence Science & Technology Organisation, Australia*)

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**Readership:** Professional and researchers in the field of nonlinear science, chaos and dynamical and complex systems.

**612pp** **Jan 2015**  
**978-981-4635-86-8** **US\$155** **£102**  
**978-981-4635-87-5(ebook)** **US\$202** **£133**



World Scientific Lecture Notes in Complex Systems — Vol. 12

### Engineering of Chemical Complexity II

edited by **Alexander S Mikhailov & Gerhard Ertl**

(*Fritz Haber Institute of the Max Planck Society, Germany*)

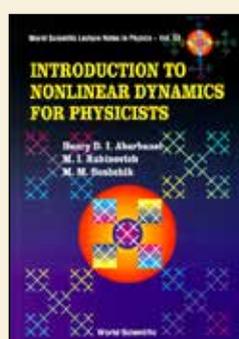
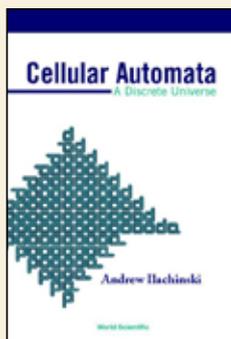
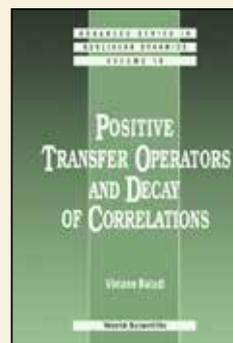
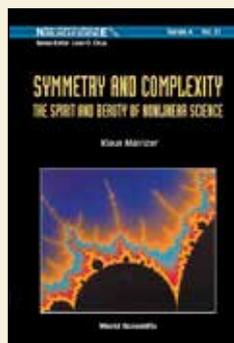
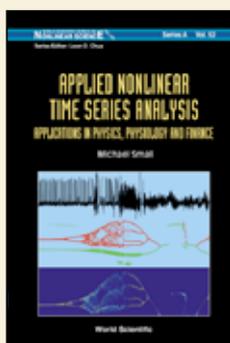
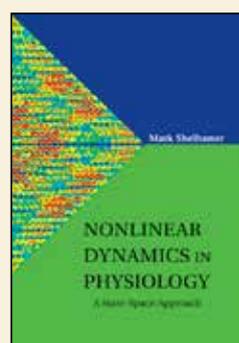
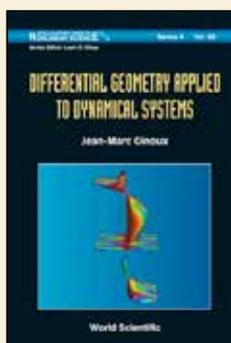
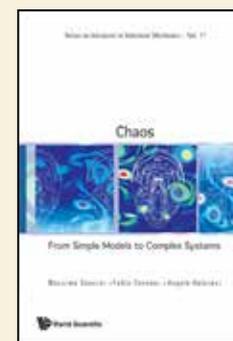
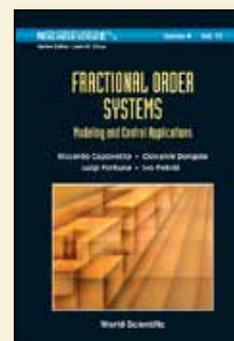
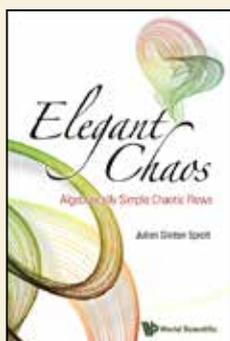
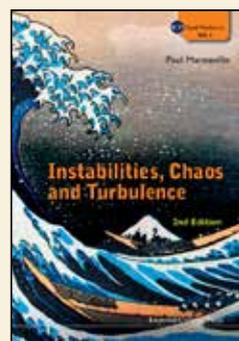
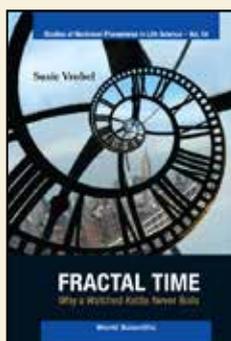
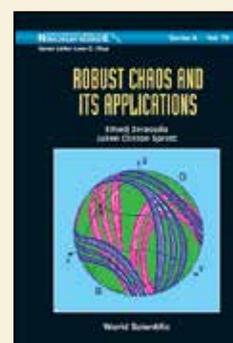
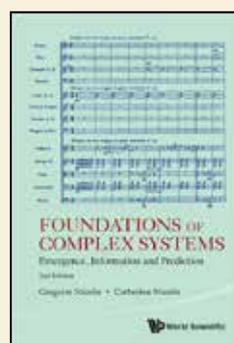
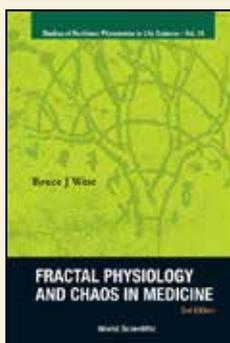
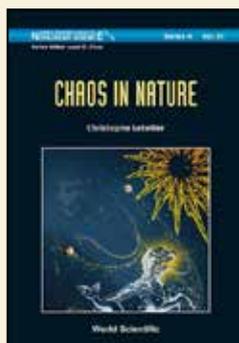
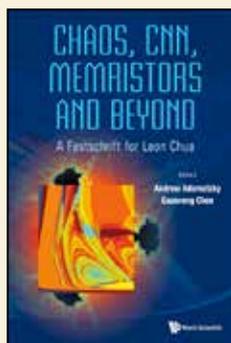
Co-edited by the Nobel laureate Gerhard Ertl, this book provides a broad perspective over the current research aimed at understanding, the design and control of complex chemical systems of various origins, on the scales ranging from single molecules and nano-phenomena to macroscopic chemical reactors. The reviews, prepared by leading international experts from the EU, USA, Russia and Japan, together yield a fascinating picture of a rapidly developing research discipline that brings chemical engineering to new frontiers.

**Readership:** Graduate students, research scientists and academics interested in the study of complex chemical systems.

**296pp** **Dec 2014**  
**978-981-4616-12-6** **US\$99** **£65**  
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