

Preface

About the Subject

Chaos theory is a field of study in mathematics with several applications in science and engineering. Chaotic systems are nonlinear dynamical systems and maps that are highly sensitive to initial conditions. The sensitivity to initial conditions is usually called the *butterfly effect* for dynamical systems and maps.

Chaotic systems can be observed in many natural systems such as weather and climate. Chaos theory has applications in several areas such as vibration control, electric circuits, chemical reactions, lasers, combustion engines, computers, cryptosystems, encryption, secure communications, biology, medicine, management, finance, etc. Chaotic behaviour of systems can be modelled by discrete-time or continuous-time mathematical models.

About the Book

The new Springer book, *Advances and Applications in Chaotic Systems*, consists of 25 contributed chapters by subject experts who are specialized in the various topics addressed in this book. The special chapters have been brought out in this book after a rigorous review process in the broad areas of modelling and application of chaotic systems. Special importance was given to chapters offering practical solutions and novel methods for the recent research problems in the modelling and application of chaotic systems.

This book discusses trends and applications of chaos modeling and chaotic systems in science and engineering.

Objectives of the Book

The objective of this book takes a modest attempt to cover the framework of advances and applications of chaotic systems in a single volume. The book is not only a valuable title on the publishing market, it is also a successful synthesis

of control techniques applied to chaotic systems. Several multidisciplinary applications of chaotic systems in control, engineering and information technology are discussed in this book.

Organization of the Book

This well-structured book consists of 25 full chapters.

Book Features

- The chapters deal with the recent research problems in the areas of chaos theory, chaos modelling and applications.
- The chapters contain a good literature survey with a long list of references.
- The chapters are well written with a good exposition of the research problem, methodology and block diagrams.
- The chapters are lucidly illustrated with numerical examples and simulations.
- The chapters discuss details of engineering applications and future research areas.

Audience

The book is primarily meant for researchers from academia and industry, who are working in the research areas—chaos theory, control engineering, computer science and information technology. The book can also be used at the graduate or advanced undergraduate level as a textbook or major reference for courses such as nonlinear dynamical systems, control systems, mathematical modelling, computational science, numerical simulation and many others.

Acknowledgements

As the editors, we hope that the chapters in this well-structured book will stimulate further research in chaos theory, computational intelligence and control systems and utilize them in real-world applications.

We hope sincerely that this book, covering so many different topics, will be very useful for all readers.

We would like to thank all the reviewers for their diligence in reviewing the chapters.

Special thanks go to Springer, especially the book editorial team.

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