Preface

Research at the intersection of management and physics has remarkably grown in recent years, and it has become a source of interest and innovation for both areas.

The subject of Chaos Theory and its applications were enriched by the scientist and engineers for the last few decades. It has wide real world applications in the field of control theory, communications and cryptography, complex and other networks, image processing, and biological and ecological systems.

Recently, Chaos and its applications are found to be very useful in the area of management and social sciences.

For the last decade, chaos and complexity began appearing in the social science articles. This interdisciplinary spread of ideas was accompanied by expectations that many major problems in the social sciences could be controlled with the nonlinear and chaos based techniques. Important ideas and methods also have been adapted from the complex system applications.

As per as managements and business applications concerned, Chaos theory plays an important role to solve various problems for the last few years. It can control the financial and accounting hazards, has a good impact to predict the nature of stock markets and the returns, leadership methods and techniques and organization intelligent, risk and cognitive managements, econophysics, as well as land, water, and geospatial managements.

This book is aimed to shed some light on the various applications of chaos and complexity theories in management applications. The total 19 chapters are based on recent and advanced developments of the subject. A few interesting highlights include:

- Ordinary and fractional finance systems
- Recurrence analysis and nonlinear correlations of financial and stock market
- Chaos and complexity in organization, teams, and leadership
- Econophysics and demoscopo-physics
- Agent based models and nonparametric estimations
- Water, land, power plants, and geospatial managements
- Social network, actor-network theory, finite element analysis, clustering, and cross functional team behaviors

The book is a combination of new results analysis with a review of some previous works. The different topics are explained in details to understand the subject. The new results have been verified by analytical methods with various simulations, advanced statistical analysis of data, and case studies. The advanced nonlinear methods like visual recurrence, visual cross correlations, delay embedded phase reconstruc-
tions, et cetera are also used for investigations. The methods are very rapid and effective and show their validity and potential for the management problems arising in dynamical systems and chaos theory.

It is not necessary to go through the book in a linear way (from chapter 1 to chapter 19). The only relationship between the chapters is that all of them contain the recent developments and applications of chaos theory from various branches of management.

Finally, the main aim is to inspire the reader to appreciate the beauty, usefulness, and uniqueness of the nonlinear applications in management related problems.

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