Edited by Matthias Dehmer
and Frank Emmert-Streib

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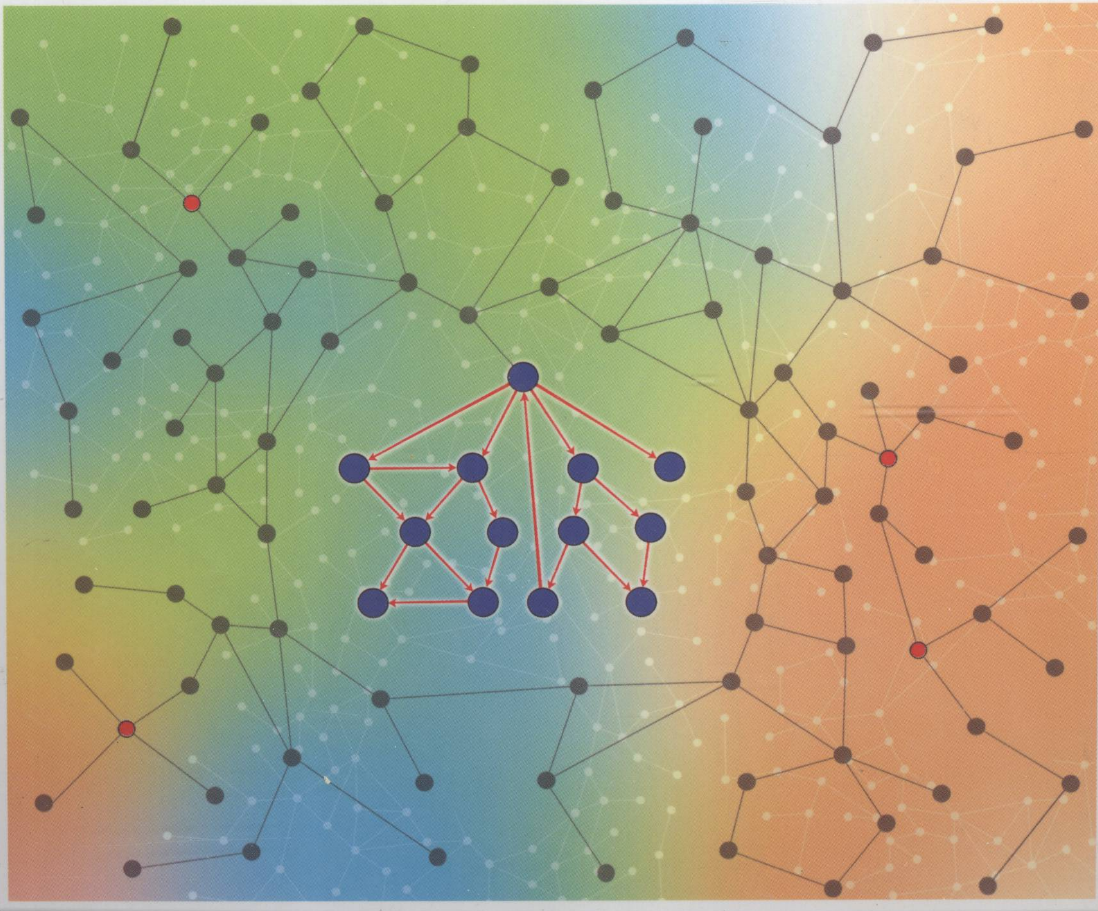
Analysis of Complex Networks

From Biology to Linguistics



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Preface

This book, *Analysis of Complex Networks: From Biology to Linguistics*, presents theoretical and practical results on graph-theoretic methods that are used for modeling as well as structurally investigating complex networks. Instead of focusing exclusively on classical graph-theoretic approaches, its major goal is to demonstrate the importance and usefulness of network-based concepts for scientists in various disciplines. Further, the book advocates the idea that theoretical as well as applied results are needed to enhance our knowledge and understanding of networks in general and as representations for various problems. We emphasize methods for analyzing graphs structurally because it has been shown that especially data-driven areas such as web mining, computational and systems biology, chemical informatics, and cognitive sciences profit tremendously from this field.

The main topics treated in this book can be summarized as follows:

- Information-theoretic methods for analyzing graphs
- Problems in quantitative graph theory
- Structural graph measures
- Investigating novel network classes
- Metrical properties of graphs
- Aspects in algorithmic graph theory
- Analytic methods in graph theory
- Network-based applications

Analysis of Complex Networks: From Biology to Linguistics is intended for an interdisciplinary audience ranging from applied discrete mathematics, artificial intelligence, and applied statistics to computer science, computational and systems biology, cognitive science, computational linguistics, machine learning, mathematical chemistry, and physics. Many colleagues, whether consciously or unconsciously, provided us with input, help, and support before and during the development of the present book. In particular we would like to thank Andreas Albrecht, Rute Andrade, Gökhan Bakır, Alexandru T. Balaban, Subhash Basak, Igor Bass, Natália Bebiano,

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Finally, we hope that this book helps the reader to understand that the presented field is multifaceted in depth and breadth and as such is inherently interdisciplinary. This is important to realize because it allows one to pursue a problem-oriented rather than field-oriented approach to efficiently tackling state-of-the-art problems in modern sciences.

Vienna and Belfast,
March 2009

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