1. Record Nr. UNINA9910139802803321

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Titolo	Analysis of complex networks [[electronic resource]] : from biology to linguistics / / edited by Matthias Dehmer and Frank Emmert-Streib
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2009
ISBN	1-282-68269-5 9786612682698 3-527-62798-7 3-527-62799-5
Edizione	[1st edition]
Descrizione fisica	1 online resource (482 p.)
Altri autori (Persone)	DehmerMatthias <1968-> Emmert-StreibFrank
Disciplina	515
Soggetti	Mathematical analysis Information networks Graph theory Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Analysis of Complex Networks From Biology to Linguistics; Contents; Preface; List of Contributors; 1 Entropy, Orbits, and Spectra of Graphs; 1.1 Introduction; 1.2 Entropy or the Information Content of Graphs; 1.3 Groups and Graph Spectra; 1.4 Approximating Orbits; 1.4.1 The Degree of the Vertices; 1.4.2 The Point-Deleted Neighborhood Degree Vector; 1.4.3 Betweenness Centrality; 1.5 Alternative Bases for Structural Complexity; References; 2 Statistical Mechanics of Complex Networks; 2.1 Introduction; 2.1.1 Network Entropies; 2.1.2 Network Hamiltonians; 2.1.3 Network Ensembles 2.1.4 Some Definitions of Network Measures2.2 Macroscopics: Entropies for Networks; 2.2.1 A General Set of Network Models Maximizing Generalized Entropies; 2.2.1.1 A Unified Network Model; 2.2.1.2 Famous Limits of the Unified Model; 2.2.1.3 Unified Model: Additional Features; 2.3 Microscopics: Hamiltonians of Networks - Network Thermodynamics; 2.3.1 Topological Phase Transitions; 2.3.2 A Note on Entropy; 2.4 Ensembles of Random Networks - Superstatistics;

2.5 Conclusion; References; 3 A Simple Integrated Approach to Network Complexity and Node Centrality; 3.1 Introduction
3.2 The Small-World Connectivity Descriptors3.3 The Integrated Centrality Measure; References; 4 Spectral Theory of Networks: From Biomolecular to Ecological Systems; 4.1 Introduction; 4.2 Background on Graph Spectra; 4.3 Spectral Measures of Node Centrality; 4.3.1 Subgraph Centrality as a Partition Function; 4.3.2 Application; 4.4 Global Topological Organization of Complex Networks; 4.4.1 Spectral Scaling Method; 4.4.2 Universal Topological Classes of Networks; 4.4.3 Applications; 4.5 Communicability in Complex Networks; 4.5.1 Communicability and Network Communities
4.5.2 Detection of Communities: The Communicability Graph4.5.3 Application; 4.6 Network Bipartivity; 4.6.1 Detecting Bipartite Substructures in Complex Networks; 4.6.2 Application; 4.7 Conclusion; References; 5 On the Structure of Neutral Networks of RNA Pseudoknot Structures; 5.1 Motivation and Background; 5.1.1 Notation and Terminology; 5.2 Preliminaries; 5.3 Connectivity; 5.4 The Largest Component; 5.5 Distances in n-Cubes; 5.6 Conclusion; References; 6 Graph Edit Distance - Optimal and Suboptimal Algorithms with Applications; 6.1 Introduction; 6.2 Graph Edit Distance
6.3 Computation of GED6.3.1 Optimal Algorithms; 6.3.2 Suboptimal Algorithms; 6.3.2.1 Bipartite Graph Matching; 6.4 Applications; 6.4.1 Graph Data Sets; 6.4.2 GED-Based Nearest-Neighbor Classification; 6.4.3 Dissimilarity-Based Embedding Graph Kernels; 6.5 Experimental Evaluation; 6.5.1 Optimal vs. Suboptimal Graph Edit Distance; 6.5.2 Dissimilarity Embedding Graph Kernels Based on Suboptimal Graph Edit Distance; 6.6 Summary and Conclusions; References; 7 Graph Energy; 7.1 Introduction; 7.2 Bounds for the Energy of Graphs; 7.2.1 Some Upper Bounds; 7.2.2 Some Lower Bounds
7.3 Hyperenergetic, Hypoenergetic, and Equienergetic Graphs

Sommario/riassunto

Mathematical problems such as graph theory problems are of increasing importance for the analysis of modelling data in biomedical research such as in systems biology, neuronal network modelling etc. This book follows a new approach of including graph theory from a mathematical perspective with specific applications of graph theory in biomedical and computational sciences. The book is written by renowned experts in the field and offers valuable background information for a wide audience.