**Spectral Clustering and Biclustering: Learning Large Graphs and Contingency Tables**

Marianna Bolla

**DESCRIPTION**

**Explores regular structures in graphs and contingency tables by spectral theory and statistical methods**

This book bridges the gap between graph theory and statistics by giving answers to the demanding questions which arise when statisticians are confronted with large weighted graphs or rectangular arrays. Classical and modern statistical methods applicable to biological, social, communication networks, or microarrays are presented together with the theoretical background and proofs.

This book is suitable for a one-semester course for graduate students in data mining, multivariate statistics, or applied graph theory; but by skipping the proofs, the algorithms can also be used by specialists who just want to retrieve information from their data when analysing communication, social, or biological networks.

**Spectral Clustering and Biclustering:**

- Provides a unified treatment for edge-weighted graphs and contingency tables via methods of multivariate statistical analysis (factoring, clustering, and biclustering).

- Uses spectral embedding and relaxation to estimate multiway cuts of edge-weighted graphs and bicuts of contingency tables.

- Goes beyond the expanders by describing the structure of dense graphs with a small spectral gap via the structural eigenvalues and eigen-subspaces of the normalized modularity matrix.
• Treats graphs like statistical data by combining methods of graph theory and statistics.

• Establishes a common outline structure for the contents of each algorithm, applicable to networks and microarrays, with unified notions and principles.

ABOUT THE AUTHOR

She is graduated from the Eötvös University of Budapest and holds a PhD (1984); further, a CSc degree (1993) from the Hungarian Academy of Sciences. Currently, she is a professor of the Institute of Mathematics, Budapest University of Technology and Economics and adjoint professor of the Central European University of Budapest. She also leads an undergraduate research course on Spectral Clustering in the Budapest Semester of Mathematics.

Her fields of expertise are multivariate statistics, applied graph theory, and data mining of social, biological, and communication networks. She has been working in various national and European research projects related to networks and data analysis.


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