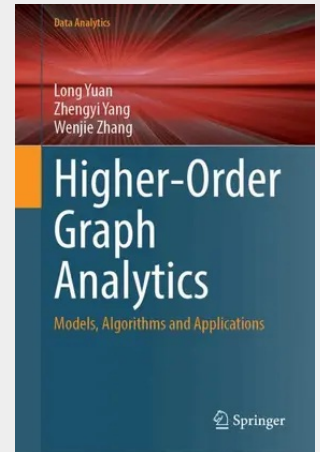


# Higher-Order Graph Analytics

Models, Algorithms and Applications

Graphs have become a fundamental tool for data analysis, but conventional models based on homogeneous, static, and pairwise connections often leave important information hidden. Higher-order graph analytics reveals a richer view of connected data by distinguishing typed relationships, tracing time-ordered interactions, studying dependencies across layers, and capturing multiway group relationships. These capabilities open new possibilities for analyzing complex data in social networks, transportation, communication, biology, finance, and many other domains. This book provides a systematic guide to higher-order graph analytics through four major models: heterogeneous information networks (HINs), temporal graphs, multilayer graphs, and hypergraphs. For each model, it connects key concepts and problem formulations with computational methods, algorithms, and real-world applications. The discussion shows how semantic types, temporal order, cross-layer dependencies, and multiway interactions change the way graph data is modeled and analyzed. Covering core tasks, including centrality, community detection, cohesive subgraph analysis, traversal, and pattern matching, the book equips readers with the tools and knowledge needed to analyze complex graph data effectively. It serves as an essential resource for researchers, data scientists, and students seeking to master this rapidly evolving field and apply higher-order graph analytics across disciplines.

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