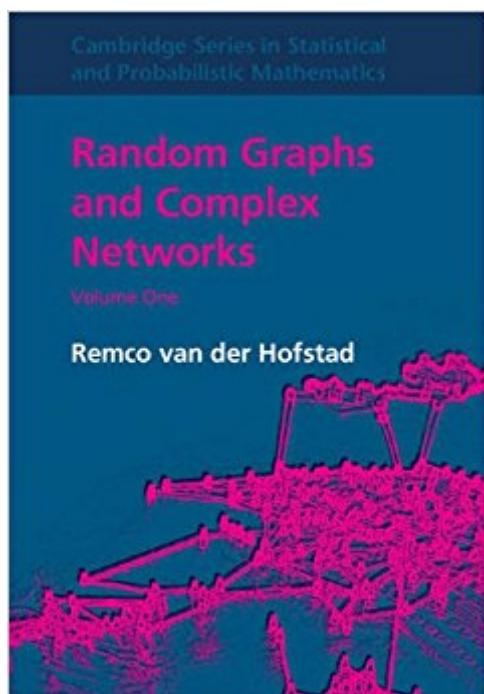


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Random Graphs And Complex Networks: Volume 1 (Cambridge Series In Statistical And Probabilistic Mathematics)



Synopsis

This rigorous introduction to network science presents random graphs as models for real-world networks. Such networks have distinctive empirical properties and a wealth of new models have emerged to capture them. Classroom tested for over ten years, this text places recent advances in a unified framework to enable systematic study. Designed for a master's-level course, where students may only have a basic background in probability, the text covers such important preliminaries as convergence of random variables, probabilistic bounds, coupling, martingales, and branching processes. Building on this base - and motivated by many examples of real-world networks, including the Internet, collaboration networks, and the World Wide Web - it focuses on several important models for complex networks and investigates key properties, such as the connectivity of nodes. Numerous exercises allow students to develop intuition and experience in working with the models.

Book Information

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Customer Reviews

"... a modern and deep, yet accessible, introduction to the models that make up [the] basis for the theoretical study of random graphs and complex networks. The book strikes a balance between providing broad perspective and analytic rigor that is a pleasure for the reader." Adam Wierman, California Institute of Technology "This text builds a bridge between the mathematical world of random graphs and the real world of complex networks. It combines techniques from probability

theory and combinatorics to analyze the structural properties of large random graphs. Accessible to network researchers from different disciplines, as well as masters and graduate students, the material is suitable for a one-semester course, and is laced with exercises that help the reader grasp the content. The exposition focuses on a number of core models that have driven recent progress in the field, including the Erdős-Rényi random graph, the configuration model, and preferential attachment models. A detailed description is given of all their key properties. This is supplemented with insightful remarks about properties of related models so that a full panorama unfolds. As the presentation develops, the link to complex networks provides constant motivation for the routes that are being chosen." Frank den Hollander, Leiden University "The first volume of Remco van der Hofstad's Random Graphs and Complex Networks is the definitive introduction into the mathematical world of random networks. Written for students with only a modest background in probability theory, it provides plenty of motivation for the topic and introduces the essential tools of probability at a gentle pace. It covers the modern theory of Erdős-Rényi graphs, as well as the most important models of scale-free networks that have emerged in the last fifteen years. This is a truly wonderful first volume; the second volume, leading up to current research topics, is eagerly awaited." Peter Mörters, University of Bath "This new book on random graph models for complex networks is a wonderful addition to the field. It takes the uninitiated reader from the basics of graduate probability to the classical Erdős-Rényi random graph before terminating at some of the fundamental new models in the discipline. The author does an exemplary job of both motivating the models of interest and building all the necessary mathematical tools required to give a rigorous treatment of these models. Each chapter is complemented by a comprehensive set of exercises allowing the reader ample scope to actively master the techniques covered in the chapter." Shankar Bhamidi, University of North Carolina, Chapel Hill "This book is invaluable for anybody who wants to learn or teach the modern theory of random graphs and complex networks. I have used it as a textbook for long and short courses at different levels. Students always like the book because it has all they need: exciting high-level ideas, motivating examples, very clear proofs, and an excellent set of exercises. Easy to read, extremely well structured, and self-contained, the book builds proficiency with random graph models essential for state-of-the-art research." Nelly Litvak, University of Twente

Network science is one of the fastest growing areas in science and business. This classroom-tested, self-contained book is designed for master's-level courses and provides a rigorous treatment of random graph models for networks, featuring many examples of real-world

networks for motivation and numerous exercises to build intuition and experience.

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