**Modern Graph Theory.** *By Béla Bollobás.* Springer Verlag, New York, 1998. $34.95. xiii+394 pp., softcover. Graduate Texts in Mathematics. Vol 184. ISBN 0-387-98488-7.

This text is a revised and updated version of the author's book, *Graph Theory — An Introductory Course*, which was published almost twenty years ago as Volume 63 of the same Graduate Texts in Mathematics series. While the tables of contents for the two books appear similar, there is enough new material to justify giving this revision a new title rather than simply calling it a second edition.

This text is about the pursuit of graph theory as a subject within the realm of "pure" mathematics. It accurately reflects the author's interests in extremal problems, algebraic techniques and the so-called probabilistic method. Although some of the book's topics have very useful applications, they are treated more for their intrinsic appeal and their application to similarly appealing areas of mathematics. For example, early material about electrical networks is used to understand the problem from recreational mathematics that asks for a subdivision of a square into finitely many squares of distinct sizes. And sections on network flows are less concerned with shipping goods from a source to a sink than with their use in proving theorems about connectivity. However, it is one of this book's strengths that it repeatedly describes the interconnections between areas of graph theory and the ways that graph theory connects with other areas of mathematics. For example, the section on strongly regular graphs does not pass by the opportunity to describe their role in the description of some of the sporadic simple groups. For the mathematician that thinks that graph theory lacks rigor or utility (the "slums of topology"?) a careful reading of this text should convince him or her otherwise.

While this text is written very precisely, it is still written as a textbook. The author rarely sacrifices instruction for economy of presentation. For example, four different proofs are given for Turán's theorem. Every effort is made to help the reader understand which areas present difficulties, which are routine and how they all fit together to form the larger subject of graph theory itself. Each chapter concludes with an extensive set of exercises, numbering between forty and ninety problems. The quantity and range of problems (very few are routine or computational) are perhaps the book's greatest strength. A graduate student who reads through this text carefully, and works many of the exercises diligently, will emerge very familiar and proficient with the ideas and techniques of modern graph theory.

The book lacks a bibliography, but each chapter concludes with a page or two that describes how the referenced literature fits into the overall development of the subject, including citations for works mentioned in the chapter. These notes provide the interested reader with ample direction and advice on how to learn more about the chapter's subject, and are an excellent accompaniment.

How does this book differ from its progenitor? First, it is much longer, with each chapter having half again or more pages in the newer version. The first two chapters are titled Fundamentals; and Electrical Networks. While each has been updated, their subsections have not changed. The next three chapters discuss Flows, Connectivity and Matching; Extremal Problems; and Colouring. Each of these chapters has grown substantially and each has included new topics. For example, the chapter on coloring has a new section about list colouring and a new section about perfect graphs. The next three chapters cover Ramsey Theory; Random Graphs; and Graphs, Groups and Matrices. Each of these has been substantially reorganized from the previous version. The book concludes with two new chapters about Random Walks on Graphs; and The Tutte Polynomial.

For the mathematician wanting to learn about graph theory as a discipline in its own right, the appearance of this updated version will be welcome.

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