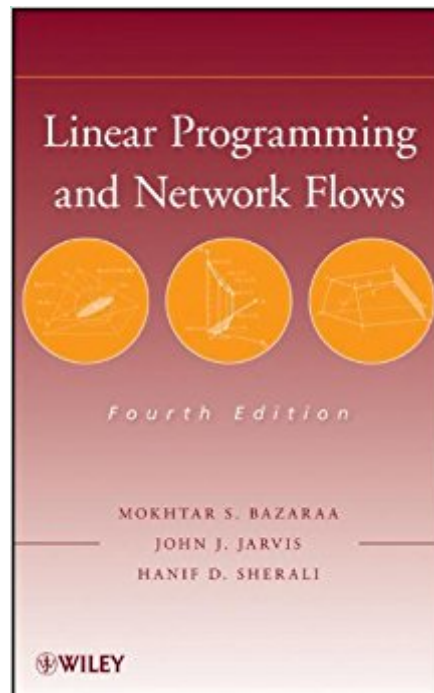




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Linear Programming And Network Flows



Synopsis

The authoritative guide to modeling and solving complex problems with linear programming—extensively revised, expanded, and updated The only book to treat both linear programming techniques and network flows under one cover, *Linear Programming and Network Flows*, Fourth Edition has been completely updated with the latest developments on the topic. This new edition continues to successfully emphasize modeling concepts, the design and analysis of algorithms, and implementation strategies for problems in a variety of fields, including industrial engineering, management science, operations research, computer science, and mathematics. The book begins with basic results on linear algebra and convex analysis, and a geometrically motivated study of the structure of polyhedral sets is provided. Subsequent chapters include coverage of cycling in the simplex method, interior point methods, and sensitivity and parametric analysis. Newly added topics in the Fourth Edition include: The cycling phenomenon in linear programming and the geometry of cycling Duality relationships with cycling Elaboration on stable factorizations and implementation strategies Stabilized column generation and acceleration of Benders and Dantzig-Wolfe decomposition methods Line search and dual ascent ideas for the out-of-kilter algorithm Heap implementation comments, negative cost circuit insights, and additional convergence analyses for shortest path problems The authors present concepts and techniques that are illustrated by numerical examples along with insights complete with detailed mathematical analysis and justification. An emphasis is placed on providing geometric viewpoints and economic interpretations as well as strengthening the understanding of the fundamental ideas. Each chapter is accompanied by Notes and References sections that provide historical developments in addition to current and future trends. Updated exercises allow readers to test their comprehension of the presented material, and extensive references provide resources for further study. *Linear Programming and Network Flows*, Fourth Edition is an excellent book for linear programming and network flow courses at the upper-undergraduate and graduate levels. It is also a valuable resource for applied scientists who would like to refresh their understanding of linear programming and network flow techniques.

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Customer Reviews

"The book can be used both as reference and as textbook for advanced undergraduate students and first-year graduate students in the fields of industrial engineering, management, operation research, computer science, mathematics and other engineering disciplines that deal with the subjects of linear programming and network flows." (Zentralblatt MATH, 2011)

Addresses the problem of minimizing or maximizing a linear function in the presence of linear equality or inequality constraints. Provided are methods for modeling complex problems via effective algorithms on modern computers. The general theory and characteristics of optimization problems are presented, along with effective solution algorithms. Explores linear programming and network flows, employing polynomial-time algorithms and various specializations of the simplex method. Includes many numerical examples to illustrate theory and techniques. --This text refers to an out of print or unavailable edition of this title.

****DISCLAIMER:** I haven't yet read the portion of the book on network flows. The authors tie the geometry and algebra of linear programs together in a natural, intuitive way. My background has been mostly in pure mathematics, and I feel like this text is written in my language: it's rigorous and insightful, but not pedantic. At the same time, plenty of concrete examples are provided and worked through, which is helpful. Some maturity is needed, especially comfort with linear algebra and proofs, the latter since the writing is (pleasantly) conversational, and the authors generally rely on the reader to recognize when something is being proved. It is helpful to have some experience with the basics of convex geometry and linear programming beforehand, too: I remember thinking as I read the sections on Carathéodory's representation theorem, basic feasible solutions, and the simplex method - especially the establishment and use of all the equivalent forms of the canonical

LP - that I would have struggled a bit if I hadn't seen the material before. Overall, this is a wonderful book for the mathematically-minded who want to really understand linear programming, and I look forward to finishing it.

I am currently working toward a Ph.D. in Management Science and used this book for a LP course. If you can get past the matrix algebra (which isn't too terribly difficult) you will find that this book contains more practical LP information than any other resource available. However, those looking for a "how to" book on linear programming might want to try a more elementary text first. This book is geared toward those interested in the more advanced computational aspects of LP (e.g., revised simplex method, LU decomposition, product form of the inverse, bounded variables, etc.). The chapter on sensitivity analysis is particularly well written and thorough. But beware, this book packs more info per page than I have ever seen!!!

The book came on time and in great condition although I bought it used. Regarding the book: It is a great book for undergraduate and graduate students who want to go in depth on the concepts of linear programming. I would highly recommend this book (especially the first six chapters)

Great. I love the book and it thankful to the supplier. It was unbelievable delivery.

The techniques described are very theoretical but are friendly to be used in Computer programs. Has a great deal of depth.

It was exactly like what they say. I like it! Its shipment by usual service took 5 days. get it and enjoy from your book!

I used this book as part of my grad level LP course that covered the first half of the book. Let me start out by saying that this is by no means a beginner's book. This book assumes a strong Linear Algebra and basic OR (assumes you know the Simplex method solution procedure, etc.) knowledge. If you are looking to get these OR prerequisites, then refer to the basic OR books by Hillier & Lieberman, Wayne Winston, Ignizio & Cavalier or A. Ravindran; this book is not for you. This book is outstanding for understanding the theory and mathematical mechanics of LP and the first half of the book covers this comprehensively. The exercises in this book are outstanding (and can be hard). For those who need this book but are weak or rusty on the basics (like I was :)) refer to

one of the books above (I liked the Ignizio & Cavalier book a lot). I can't comment on the Network flows part of the book but it will almost surely be excellent if it is anything like the first half. An excellent book for the intended audience.

I used this text while taking a graduate linear programming (LP) course on LP and network flows. I really liked the treatment. The typesetting was clear, consistent and easily followed (not as good as Nash and Sofer's). The book also includes lots of nice side discussion on how or why the theory is the way it is. Plenty of references are offered for further study. Proofs were not rigorous. The highly mathematical reader may be disappointed by the "show proof" style used instead of a rigorous theorem-proof style. In fact, I seem to recall a time or two where the theorem came after the usage. For me, I didn't mind that, but a pure math guy would likely grind his teeth. The network material was acceptable. I personally thought the text problems were not of the best quality. I would suggest a teacher supplement their own favorites outside of the book. One caution is that the book is somewhat aged. I noticed a text like Nash and Sofer seems to have newer updates on the theory. Overall, a great read for getting into the nitty gritty details of LP.

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