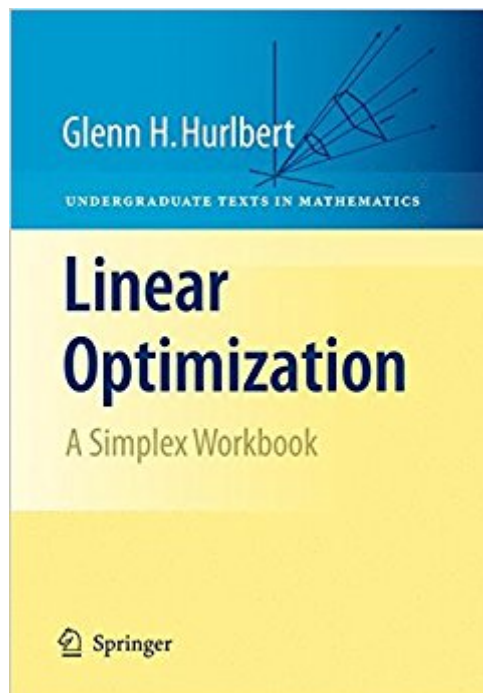




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# Linear Optimization: The Simplex Workbook (Undergraduate Texts In Mathematics)



## Synopsis

The Subject A little explanation is in order for our choice of the title Linear Optimization (and corresponding terminology) for what has traditionally been called Linear Programming. The word programming in this context can be confusing and/or misleading to students. Linear programming problems are referred to as optimization problems but the general term linear programming remains. This can cause people unfamiliar with the subject to think that it is about programming in the sense of writing computer code. It isn't. This workbook is about the beautiful mathematics underlying the ideas of optimizing linear functions subject to linear constraints and the algorithms to solve such problems. In particular, much of what we discuss is the mathematics of Simplex Algorithm for solving such problems, developed by George Dantzig in the late 1940s. The word program in linear programming is a historical artifact. When Dantzig first developed the Simplex Algorithm to solve what are now called linear programming problems, his initial model was a class of resource allocation problems to be solved for the U.S. Air Force. The decisions about the allocations were called Programs by the Air Force, and hence the term.

## Book Information

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## Customer Reviews

From the reviews: "In an effort at reform, Hurlbert (Arizona State) dubs his subject linear optimization. the author designs his work for discovery-based learning. Ideally, this volume offers students the opportunity to recapitulate the Socratic

process for reinforcement  $\hat{A} = \hat{A}$ . Summing Up: Recommended. Lower-division undergraduates.  $\hat{A} = \hat{A}$  (D. V. Feldman, Choice, Vol. 47 (9), May, 2010)  $\hat{A} = \hat{A}$  "Hurlbert  $\hat{A} = \hat{A}$ , $\hat{A}$ 's textbook focuses on the mathematics of linear programming and important connections to linear algebra, graph theory, convexity, and game theory. The author has adopted the Moore method in which students are given some basic terminology and definitions and are then asked to develop the subject by proving a series of theorems.  $\hat{A} = \hat{A}$  This textbook would be very suitable for an undergraduate course in linear programming that uses the Moore method.  $\hat{A} = \hat{A}$  (Brian Borchers, The Mathematical Association of America, February, 2010)  $\hat{A} = \hat{A}$  "This text is  $\hat{A} = \hat{A}$  oriented toward duality as central to solving and understanding linear optimization problems.  $\hat{A} = \hat{A}$  Sequential steps in the  $\hat{A} = \hat{A}$  Workouts  $\hat{A} = \hat{A}$ , $\hat{A}$  help guide the student through the discovery process.  $\hat{A} = \hat{A}$  this book would be an excellent choice for an instructor wishing to teach linear optimization to a motivated class. There is enough in here to sustain every taste and approach and create an excellent first course in optimization.  $\hat{A} = \hat{A}$  (Steven R. Dunbar, SIAM Review, Vol. 53 (3), 2011)

This undergraduate textbook is written for a junior/senior level course on linear optimization. Unlike other texts, the treatment allows the use of the "modified Moore method" approach by working examples and proof opportunities into the text in order to encourage students to develop some of the content through their own experiments and arguments while reading the text. Additionally, the focus is on the mathematics underlying the ideas of optimizing linear functions under linear constraints and the algorithms used to solve them. In particular, the author uses the Simplex Algorithm to motivate these concepts. The text progresses at a gentle and inviting pace. The presentation is driven by numerous examples and illustrations. Ample exercises are provided at the end of each chapter for mastering the material. Opportunities for integrating Maple (or similar) software are included in the book. The author  $\hat{A} = \hat{A}$ , $\hat{A}$ 's own WebSim software can be freely downloaded from his website for pedagogical use. The teacher's version of the text contains solutions embedded within the text, rather than in an appendix. It also has extra material and suggestions for the teacher  $\hat{A} = \hat{A}$ , $\hat{A}$ 's benefit. Junior/senior level undergraduate students will benefit from the book, as will beginning graduate students. Future secondary school mathematics teachers will also find this book useful. Arizona State University Professor Glenn H. Hurlbert has published nearly 50 articles in graph theory, combinatorics, and optimization, and has been the recipient of numerous teaching and mentoring awards from ASU, the ASU Parents Association, the School of Mathematical and Statistical Sciences, and the Mathematical Association of America.

$$\begin{aligned} & \text{to } \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{L}}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \neg \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{J}}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \\ & \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{L}}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \neg \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{J}}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \\ & \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{L}}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \neg \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{a} \sim \tilde{A} \hat{a} \tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}_{\mathcal{J}}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A}^{\circ}\tilde{A}f\hat{A}\cdot\tilde{A} \hat{A} \end{aligned}$$

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