

## Linear Programming, an introduction

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Linear Programming is presented at an introductory level, mainly from the book by Hillier and Lieberman [2005], abridged and adapted to suit the objectives of the "Operational Research" course. It begins with segments of its third chapter.

*Key words:* linear programming; simplex method.

### I. Fundamentals and scope

Based on a prototype example, Linear Programming is presented, as well as the simplex method of resolution. This method was first presented by G. B. Dantzig in 1947 [MacTutor, 2007]. The text is based on the book by Hillier and Lieberman [2005], and begins with segments of the third chapter of the book.

### II. Explanation of the simplex method

#### 3 Introduction to Linear Programming

(11&L 25)

The development of linear programming has been ranked among the most important scientific advances in the mid-20.th century, and we must agree with this assessment. Its impact since just 1950 has been extraordinary. Today it is a standard tool that has saved many thousands or millions of dollars for most companies or businesses of even moderate size in the various industrialized countries of the world; and its use in other sectors of society has been spreading rapidly.

##### 3.1 Prototype example

(11&L 26)

**Table 1** Data for the Wyndor Glass Co. problem

Plant	Production time per batch (h) Product		Production time available per week (h)
	1	2	
A	1	0	4
B	0	2	12
C	3	2	18
Profit per batch	3 000	5 000	

$x_1$  = number of batches of product 1 produced per week

$x_2$  = number of batches of product 2 produced per week

$Z$  = total profit per week (in \$1000) from producing these two products

# Linear Prog An Introduction

**Jay E. Strum**



## Linear Prog An Introduction:

**Linear Programming** A. Sultan, 2014-06-28 Includes one IBM PC floppy disk System Requirements Monochrome monitors IBM compatible machines minimum 286 IBM DOS 2.0 or higher This book gives a complete concise introduction to the theory and applications of linear programming It emphasizes the practical applications of mathematics and makes the subject more accessible to individuals with varying mathematical abilities It is one of the first rigorous linear programming texts that does not require linear algebra as a prerequisite In addition this text contains a floppy disk containing the program SIMPLEX designed to help students solve problems using the computer Key Features Less rigorous mathematically will appeal to individuals with varying mathematical abilities Includes a floppy disk containing the program SIMPLEX and an appendix to help students solve problems using the computer Includes chapters on network analysis and dynamic programming topics of great interest to business majors and industrial engineers Includes modem applications selected computer programs for solving various max min applications

*An Introduction to Linear Programming* William Wager Cooper, 1969

*An Introduction to Linear Programming and Game Theory* Paul R. Thie, Gerard E. Keough, 2011-09-15 Praise for the Second Edition This is quite a well done book very tightly organized better than average exposition and numerous examples illustrations and applications Mathematical Reviews of the American Mathematical Society An Introduction to Linear Programming and Game Theory Third Edition presents a rigorous yet accessible introduction to the theoretical concepts and computational techniques of linear programming and game theory Now with more extensive modeling exercises and detailed integer programming examples this book uniquely illustrates how mathematics can be used in real world applications in the social life and managerial sciences providing readers with the opportunity to develop and apply their analytical abilities when solving realistic problems This Third Edition addresses various new topics and improvements in the field of mathematical programming and it also presents two software programs LP Assistant and the Solver add in for Microsoft Office Excel for solving linear programming problems LP Assistant developed by coauthor Gerard Keough allows readers to perform the basic steps of the algorithms provided in the book and is freely available via the book's related Web site The use of the sensitivity analysis report and integer programming algorithm from the Solver add in for Microsoft Office Excel is introduced so readers can solve the book's linear and integer programming problems A detailed appendix contains instructions for the use of both applications Additional features of the Third Edition include A discussion of sensitivity analysis for the two variable problem along with new examples demonstrating integer programming non linear programming and make vs buy models Revised proofs and a discussion on the relevance and solution of the dual problem A section on developing an example in Data Envelopment Analysis An outline of the proof of John Nash's theorem on the existence of equilibrium strategy pairs for non cooperative non zero sum games Providing a complete mathematical development of all presented concepts and examples Introduction to Linear Programming and Game Theory Third Edition is an ideal text for

linear programming and mathematical modeling courses at the upper undergraduate and graduate levels It also serves as a valuable reference for professionals who use game theory in business economics and management science *Linear Programming* Bruce R. Feiring,1986-04 Linear Programming is a well written introduction to the techniques and applications of linear programming It clearly shows readers how to model solve and interpret appropriate linear programming problems Feiring has presented several carefully chosen examples which provide a foundation for mathematical modelling and demonstrate the wide scope of the techniques He subsequently develops an understanding of the Simplex Method and Sensitivity Analysis and includes a discussion of computer codes for linear programming This book should encourage the spread of linear programming techniques throughout the social sciences and since it has been developed from Feiring s own class notes it is ideal for students particularly those with a limited background in quantitative methods **An Introduction to Linear Programming** Abraham Charnes,William Wager Cooper,1960 **An Introduction to Linear Programming** A.. Charnes,W. W. Cooper,A.. Henderson,1960 *Linear Programming* Shokoufeh Mirzaei,2019 **Introduction to Linear Programming** Richard Darst,1990-10-26 Stressing the use of several software packages based on simplex method variations this text teaches linear programming s four phases through actual practice It shows how to decide whether LP models should be applied set up appropriate models use software to solve them and examine solutions to a **An Introduction to Linear Programming** William Wager Cooper,Alexander Henderson,Abraham Charnes,2013-04 An Economic Introduction To Linear Programming By W W Cooper And A Henderson Lectures On The Mathematical Theory Of Linear Programming By A Charnes Introduction to Practical Linear Programming David J. Pannell,1993 *Linear Programming 1* George B. Dantzig,Mukund N. Thapa,2006-04-06 Encompassing all the major topics students will encounter in courses on the subject the authors teach both the underlying mathematical foundations and how these ideas are implemented in practice They illustrate all the concepts with both worked examples and plenty of exercises and in addition provide software so that students can try out numerical methods and so hone their skills in interpreting the results As a result this will make an ideal textbook for all those coming to the subject for the first time Authors note A problem recently found with the software is due to a bug in Formula One the third party commercial software package that was used for the development of the interface It occurs when the date currency etc format is set to a non United States version Please try setting your computer date currency option to the United States option The new version of Formula One when ready will be posted on WWW *An Introduction to Linear Programming* G. R. Walsh,1985 *Linear Programming in Industry* Sven Dano,2013-04-17 The present volume is intended to serve a twofold purpose First it provides a university text of Linear Programming for students of economics or operations research interested in the theory of production and cost and its practical applications secondly it is the author s hope that engineers business executives managers and others responsible for the organization and planning of industrial operations may find the book useful as an introduction to Linear Programming methods and techniques Despite the

different backgrounds of these categories of potential reader their respective fields overlap to a considerable extent both are concerned with economic optimization problems and the use of Linear Programming to problems of production planning is simply applied theory of production The non economist reader may but should not pass over Chapter IV in which the linear production model is linked up with the economic theory of production Without being an advanced text the book aims at covering enough ground to make the reader capable of detecting formulating and solving such linear planning problems as he may encounter within his particular field No heavy demands are made on the reader's mathematical proficiency except for the proofs in the Appendix which may be skipped if desired the mathematical exposition is purely elementary involving only simple linear relations In the author's experience the pedagogical advantages of this approach as compared with the use of matrix algebra amply justify the sacrifice of mathematical elegance and typographical simplicity particularly in explaining the simplex method

**Introduction to Linear and Convex Programming** Neil Cameron, 1985-09-05 This introduction to optimization emphasizes the need for both a pure and an applied mathematical point of view Beginning with a chapter on linear algebra and Euclidean geometry the author then applies this theory with an introduction to linear programming There follows a discussion of convex analysis which finds application in non linear programming The book ends with an extensive commentary to the exercises that are given at the end of each chapter The author's straightforward geometrical approach makes this an attractive textbook for undergraduate students of mathematics engineering operations research and economics

**Introduction to Linear Programming** Jay E. Strum, 1984

**Linear Programming: An Introduction to Finite Improvement Algorithms** Daniel Solow, 2014-08-11 This text covers the basic theory and computation for a first course in linear programming including substantial material on mathematical proof techniques and sophisticated computation methods Includes Appendix on using Excel 1984 edition

**Mathematical Introduction to Linear Programming and Game Theory** Louis Brickman, 2012-12-06 Mathematical elegance is a constant theme in this treatment of linear programming and matrix games Condensed tableau minimal in size and notation are employed for the simplex algorithm In the context of these tableau the beautiful termination theorem of R G Bland is proven more simply than heretofore and the important duality theorem becomes almost obvious Examples and extensive discussions throughout the book provide insight into definitions theorems and applications There is considerable informal discussion on how best to play matrix games The book is designed for a one semester undergraduate course Readers will need a degree of mathematical sophistication and general tools such as sets functions and summation notation No single college course is a prerequisite but most students will do better with some prior college mathematics This thorough introduction to linear programming and game theory will impart a deep understanding of the material and also increase the student's mathematical maturity

**An introduction to linear programming** W. W. Cooper, Abraham Charnes, A. Henderson, 1957

*An Introduction to Linear Programming and the Theory of Games* Abraham M. Glicksman, 1979

**Linear Programming in Industry: Theory and Applications** Sven

Danö,1958

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