Linear Programming, 1: Introduction

George B. Dantzig
Mukund N. Thapa

Springer

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1: Introduction

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ABOUT THE AUTHORS

George B. Dantzig received the National Medal of Science from the President of the United States "for inventing Linear Programming and for discovering the Simplex Algorithm that led to wide-scale scientific and technical applications to important problems in logistics, scheduling, and network optimization, and to the use of computers in making efficient use of the mathematical theory." He is world famous for his twin discoveries; linear programming and the Simplex Algorithm, which together have enabled mankind for the first time to structure and solve extremely complex optimal allocation and resource problems. Among his other discoveries are the Decomposition Principle (with Philip Wolfe) which makes it possible to decompose and solve extremely large linear programs having special structures, and applications of these techniques with sampling to solving practical problems subject to uncertainty.

Since its discovery in 1947, the field of linear programming, together with its extensions (mathematical programming), has grown by leaps and bounds and is today the most widely used tool in industry for planning and scheduling.

George Dantzig received his master's from Michigan and his doctorate in mathematics from Berkeley in 1946. He worked for the U.S. Bureau of Labor Statistics, served as chief of the Combat Analysts Branch for USAF Headquarters during World War II, research mathematician for RAND Corporation, and professor and head of the Operations Research Center at the University of California, Berkeley. He is currently professor of operations research and computer science at Stanford University. He served as director of the System Optimization Laboratory and the PILOT Energy-Economic Model Project. Professor Dantzig's seminal work has laid the foundation for the field of systems engineering, which is widely used in network design and component design in computer, mechanical, and electrical engineering. His work inspired the formation of the Mathematical Programming Society, a major section of the Society of Industrial and Applied Mathematics, and numerous professional and academic bodies. Generations of Professor Dantzig's students have become leaders in industry and academia.

He is a member of the prestigious National Academy of Science, the American Academy of Arts and Sciences, and the National Academy of Engineering.

Mukund N. Thapa is the president of Stanford Business Software, Inc., as well as a consulting professor of operations research at Stanford University. He received a bachelor of technology degree in metallurgical engineering from the Indian Institute of Technology, Bombay, and M.S. and Ph.D. degrees in operations research from Stanford University. His Ph.D. thesis was concerned with developing specialized algorithms for solving large-scale unconstrained nonlinear minimization problems. By profession he is a software developer who produces commercial software products as well as commercial-quality custom software. Since 1978, Dr. Thapa has been applying the theory of operations research, statistics, and computer science to develop efficient, practical, and usable solutions to a variety of problems.

At Stanford Business Software, Dr. Thapa, ensures that the company produces high-quality turnkey software for clients. His expert knowledge of user-friendly interfaces, data bases, computer science, and modular software design plays an important role in making the software practical and robust. His speciality is the application of numerical analysis methodology to solve mathematical optimization problems. He is also an experienced modeler who is often asked by clients to consult, prepare analyses, and to write position papers. At the Department of Operations Research, Dr. Thapa teaches graduate-level courses in mathematical programming computation and numerical methods of linear programming.

TO

Tobias and Anja Dantzig, my parents, *in memoriam*,
Anne S. Dantzig, my wife, and to
the great pioneers who made this field possible:
Wassily Leontief, Tjalling Koopmans, John von Neumann,
Albert Tucker, William Orchard-Hays, Martin Beale.

— George B. Dantzig

Devi Thapa and Narain S. Thapa, my parents,
and Radhika H. Thapa, my wife.

— Mukund N. Thapa

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Contents

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List of Figures