

Reference Books:

1. Lecture Notes: Original version by S. Chu
2. Operations Research: An introduction by Hamdy A Taha
3. Introduction to Operations Research by F.S. Hillier and G.J. Liebman.
4. Theory and Problems of Operations Research by R. Bronson, SOS series

Chapter 1. MATHEMATICAL BACKGROUND

- 1.1. Linear Equations and Linear Programming
- 1.2. Systems of Linear Equations and Their Solutions
- 1.3. Properties of Solutions of Systems of Linear Equations
- 1.4. Homogeneous Systems of Linear Equations
- 1.5. Basic Solutions
- 1.6. Hyperplanes
- 1.7 Convex Sets.
- 1.8 Supporting Hyperplanes.

Chapter 2. THEORY OF SIMPLEX METHOD

- 2.1. Mathematical Programming Problems
- 2.2. Basic Feasible Solutions and Extreme Points
- 2.3. Improving a Basic Feasible Solution

Chapter 3. SIMPLEX METHOD

- 3.1. Simplex Method for Problems in Feasible Canonical Form.
- 3.2. Simplex Methods for Problems in Standard Form
- 3.3. The M -method
- 3.4. The Two-Phase Method

Chapter 4. SPECIAL CASES IN APPLYING SIMPLEX METHODS

- 4.1. Non-existence of Feasible Solutions
- 4.2. Unbounded Solutions
- 4.3. Infinite Number of Optimal Solutions
- 4.4. Degeneracy and Cycling
- 4.5. Artificial Variables in Phase II of the Two-Phase Method

Chapter 5. DUALITY

- 5.1. The Dual Problems.
- 5.2. Duality Theorems
- 5.3. The Existence Theorem and The Complementary Slackness
- 5.4. Dual Simplex Method

5.5. Post-Optimality or Sensitivity Analysis

Chapter 6. TRANSPORTATION PROBLEMS

6.1. Transportation Model.

6.2. The Simplex Method and Transportation Problems

6.3. The Starting Basic Feasible Solution

6.4. Iteration on the Transportation Tableau

6.5. Method of Multipliers.

6.6. Transshipment Model

6.7. Assignment Problems