Zbl 0912.90216

D'Alessandro, Paolo

A conical approach to linear programming. Scalar and vector optimization problems. (English)

Langhorne, PA: Gordon & Breach. xxii, 290 p. $ 150.00; £98.00 (1997).

This non-standard text on linear optimization and linear vector optimization is based on investigations of the author for several years, dealing with the geometrical structure of the range space of optimization problems. The concept of the positive cone of the vector ordering is used to state very general feasibility and optimality conditions. These conditions are directly used for developing primal algorithms. The use of polar cones of the involved cones leads to dual optimality conditions and dual computational algorithms.

The core of this conical approach are deep results about the relative position between the non-negative orthant and a linear subspace. A large amount of possible cases is categorized by the concepts of internality, weak tangency and strict tangency. The practical benefits of the theory are also investigated. Many refinements and improvements of the algorithms are introduced. Performance measurements by statistical experiments are described. A documented source code (Modula-2) of the main algorithms is also supplied.

The book will be usefull to specialists on mathematical programming, economical computer scientists and can be used for advanced courses in optimization.

E.Iwanow (Wien)

Keywords : linear optimization; algorithms; cones; convex sets; positive cone; dual optimality conditions; dual computational algorithms; tangency

Classification :

∗90C05 Linear programming

90C29 Multi-objective programming, etc.

90-01 Textbooks (optimization)