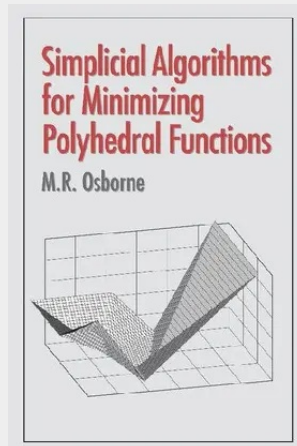


Simplicial Algorithms for Minimizing Polyhedral Functions

Polyhedral functions provide a model for an important class of problems that includes both linear programming and applications in data analysis. General methods for minimizing such functions using the polyhedral geometry explicitly are developed. Such methods approach a minimum by moving from extreme point to extreme point along descending edges and are described generically as simplicial. The best-known member of this class is the simplex method of linear programming, but simplicial methods have found important applications in discrete approximation and statistics. The general approach considered in this 2001 text has permitted the development of finite algorithms for the rank regression problem. The key ideas are those of developing a general format for specifying the polyhedral function and the application of this to derive multiplier conditions to characterize optimality. Also considered is the application of the general approach to the development of active set algorithms for polyhedral function constrained problems and associated Lagrangian forms.

This book provides the first general account of the development of simplicial algorithms. These include the ubiquitous simplex method of linear programming widely used in industrial optimization and strategic decision making and methods important in data analysis, such as problems involving very large data sets. The theoretical development is based on a new way of representing the underlying geometry of polyhedra functions (functions whose graphs are made up of plane faces), and is capable of resolving problems that occur when combinatorially large numbers of faces intersect at each vertex.

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