G. van Der Hock

REDUCTION METHODS IN NONLINEAR PROGRAMMING
Mathematical Centre, Amsterdam 1980

The big number of studies on nonlinear programming which is annually published makes it necessary to bring out at certain moments synthesis works aimed at gathering the most remarkable results in this field. Among them is also the book of G. van Der Hock.

The book is divided into six chapters: Introduction and preliminary notes; A numerical comparison of algorithms; Recurrent quadratic programming with data updating of the second order; Asymptotic properties of the reduction methods by using reduced problems with linear equality constraints; Numerical and algorithm aspects of two-phase reduction methods; A numerical comparison of two-stage algorithms and of recurrent quadratic programming algorithms.

The first chapter presents the fundamentals one operates with in the study. The second chapter presents a comparison between the methods of conjugated direction and more recent methods (SSVM and BFGS). The experiments are made on an IMB 370/158 computer. Further, the convergence in the recurrent quadratic programming problems is dealt with.

The fourth chapter of the book presents the reduction method based on the sequential linearization of constraints. The fifth chapter presents two-stage algorithms. This chapter deals with an adapted version of the Murtagh and Sargent algorithm. The last chapter approaches comparatively the algorithms on the two groups. The algorithms are applied to representative problems and the efficiency of each method in terms of a set of performance indices is pursued.

The book is extremely useful to all researchers who are interested in solving, on the computer, problems of nonlinear mathematical programming.

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