Book Reviews

Cuninghame-Green, R.: Minimax Algebra. Springer-Verlag, Berlin 1979, 258 S., DM 28,50.

Many problems in operations research as path problems, network flow problems, matching problems, and scheduling problems can be solved if the usual objective functions are replaced by more general "algebraic" objective functions. These general objective functions include lexicographical objectives, bottleneck objectives, and time-cost objectives. Recent results show that even a linear programming theory can be developed under such an algebraic setting. This is due to the fact that results in linear algebra can be formulated too for these more general algebraic structures.

In parallel to linear algebra a general theory for these structures (known in the literature as semirings, regular algebras, ordered semigroups etc.) is developed. It is a first complete presentation of this type of material. Therefore this excellent book is an important source for people working on optimization with algebraic objectives.

Osnabrück

P. Brucker

Hu, T.C.: Combinatorial Algorithms. Addison-Wesley Publishing Co., Reading 1982, bound, VI + 292 S.

The book presents a selection of combinatorial algorithms with the intention to stress the intuitive ideas in these algorithms, to describe their complexity and to illustrate them by small numerical examples. The eight chapters content solution algorithms to the following problem areas:

Chapter 1 (39 pages): Shortest paths (including decomposition algorithm), longest path and minimum spanning tree.

Chapter 2 (66 pages): Maximum flows (one- and multi-terminal), special case of minimum cost flows.

Chapter 3 (31 pages): Application of dynamic programming to the shortest path and the knapsack problem and minimum cost alphabetic trees.

Chapter 4 (24 pages): Application of backtracking techniques like branch and bound, game-trees etc.

Chapter 5 (40 pages): Optimum binary trees in encoding for the non-alphabetic and the alphabetic case.

Chapter 6 (38 pages): Heuristics like greedy algorithm, Next-Fit algorithm for bin packing and priorities in job-scheduling.

Chapter 7 (33 pages): Multiplication of large matrices and determination the optimum order of multiplying matrices by partitioning a convex polygon.

Chapter 8 (15 pages): NP-complete problems (intuitive notions).

The book may serve as a textbook as well as a reference book and can be recommended to everybody who wants to get an impression of combinatorial algorithms or to get some ideas facing a (new) combinatorial problem. No background in mathematical programming or data structures is needed. Most chapters can be read independently. At the end of each chapter comprehensive bibliographic notes and suggestions for further reading are given. Additionally, to most chapters exercises with answers are presented.

Aachen

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