PREFACE

Over the past few decades, combinatorial optimization has evolved into a major research area within the fields of operations research and computer science. This special issue of *Journal of Applied Mathematics and Decision Sciences* devoted to combinatorial optimization is comprised of a collection of six papers that span various areas of combinatorial optimization, from Boolean function to networks and from graphs to matroid theory to binary quadratic programs. Although the subject matter of the papers have been selected by the respective authors, the primary theme that links together these contributions is the development of efficient and effective solution procedures for complex optimization problems. We now briefly discuss each of these papers.

The first paper in this collection, by Renato Bruni, addresses the problem of orthogonalization of a Boolean formula. A general procedure is proposed for transforming an arbitrary conjunctive normal form or disjunctive normal form into an orthogonal normal form. Application areas of the results include reliability theory and computational complexity theory.

Combinatorial arc tolerance analysis of network flow problems is the topic of the next paper. Written by Sokkalingam and Sharma, this paper provides a thorough analysis of the problem of determining the tolerance set associated with an arc in a convex cost flow problem. It may be noted that network flow problems form an important subclass of combinatorial optimization problems that is rich in structure which can be exploited to obtain efficient algorithms. The third paper, written by Blokh, Gutin, and Yeo, also deals with networks but has a different flavor. It focuses on solving a generalized project network problem. The authors discuss complexity issues and solution algorithms.

The concept of Δ-matroid (also known as pseudomatroid) has been studied in the literature as early as 1984. Kabadi and Sridhar in their paper "Δ-matroid and jump system" point out the equivalence between Δ-matroids and jump systems leading to simple proofs of known results on jump systems. The fifth paper of this collection deals with an efficient algorithm for solving the minmax strongly connected spanning subgraph problem and a generalization of this problem. This special issue concludes with another interesting paper by Alidaee, Glover, Kochenberger, and Rego on the number partitioning problem.

The authors propose an interesting solution approach by modeling the problem as an unconstrained binary quadratic optimization problem. Results of experimental analysis with the algorithm on random data are also reported.

This special issue of JAMDS touches various branches of combinatorial optimization and applications. We hope that the papers included in this collection will enhance applicability of operations research methodologies in solving real-world optimization problems and provide further inspiration for active research works in related areas.

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