Abstract

The multidimensional multi-choice knapsack problem (MMKP) is one of the most complex members of the Knapsack Problem (KP) family. It has been used to model large problems such as telecommunications, quality of service (QoS), management problem in computer networks and admission control problem in the adaptive multimedia systems. In this paper, we propose a new approach based on strategic oscillation using surrogate constraint information. We introduce new rules to control oscillation process to solve the MMKP. The main idea is to explore both sides of the feasibility border that consists in alternating both constructive and destructive phases in a strategic oscillating manner. In order to strengthen the surrogate constraint information, we enhance the method with constraints normalization. This may improve the computational results. Numerical results show that the performance of this approach is competitive with previously published results. Performance analysis of the method shows the merits of its using in this problem class.
Using Surrogate Information to Solve Multidimensional Multi-choice Knapsack Problem

- Khan, S, Quality adaptation in a multisession multimedia system : Model, algorithms and architecture, Ph. D. dissertation, Department of Electrical and Computer Engineering, University of Victoria, Canada (1998).
- Peterson, CC, Computational experience with variants of the Balas algorithm applied to the selection of research and development projects. Management Science 13:736 50. (1967)
Using Surrogate Information to Solve Multidimensional Multi-choice Knapsack Problem


- Romain Picot-Clmente, Florence Mendes, Christophe Cruz, Christophe Nicolle.
TOURISM-KM, A variant of MMKP applied to the tourism domain. ICORES 2012, Portugal (2012)

Index Terms

Computer Science Algorithms

Keywords

Combinatorial optimization multiple choice knapsack problem tabu search surrogate constraints