Using Surrogate Information to Solve Multidimensional Multi-choice Knapsack Problem

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.

References
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- Romain Picot-Clmente, Florence Mendes, Christophe Cruz, Christophe Nicolle.
Using Surrogate Information to Solve Multidimensional Multi-choice Knapsack Problem

TOURISM-KM, A variant of MMKP applied to the tourism domain. ICORES 2012, Portugal (2012)


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Keywords

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