

A linear programming model to solve the minimax multi-period substitutable resources production-allocation problem

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Abstract :

In this paper, we present a review model of the minimax multi-period substitutable resources allocation problem. We start from the presented model and we formulate a linear programming model of the minimax multi-period substitutable resources production-allocation problem. We develop a resolution method to solve the formulated model. We present an experimental results of the formulated model and the developed method. The experimental results provide that the developed method is efficient to solve the formulated model.

Keywords : Allocation, Linear Programming, Multi-period, Production, Substitutable Resources.

1 Introduction

The main question in the field of allocation of resources is : "how to allocate available amounts of resources among users during periods?" the answer to this question need the determination of the objectives and the constraints, the formulation of the problem and the development of a resolution method to solve the formulated problem. In literature there are several researches around resources allocation problem. For instance, Klein et al. (1995) considered multi-period resources allocation problem with substitutions among resources and the surplus of resources in one period can be used in subsequent periods. Agnihotri et al. (1982) described a model for the allocation of a critical product among competing locations under stochastic demand. Kolesar and Walker (1974) described a model for relocating fire companies. Kaplan (1974) discussed the allocation of the right mix of supplies, such as ammunition, food and fuel for a military mission. Brown (1979) described a minimax model for salary administration for a large number of job classifications. Ibaraki and Katoh (1988) described apportionment problems which are concerned with the allocation of seats among electoral districts, so that the number of seats given to each district is as proportional to its population as possible.

According to Bhatnagar et al. (1993) and Lootsma (1994), production allocation problems involve allocating plant output among many markets subject to capacity constraints and market demand in order to minimize the costs of the multinational company. Ying-Hua and Young-Chang (2008) advanced the performance of Genetic Algorithms for solving production allocation problems. Holmbom and Segerstedt (2014) showed the complexities, difficulties and possibilities of scheduling and producing several different items in a single production facility with constrained capacity. The studies of Brignol and Renaud (1997), Dentcheva and Römisich (1998), Philpott et al. (2000) and Gröwe-Kuska and Römisich (2005) concerned with the formulation and resolution of the production management problems.

In this paper, we formulate a model of the minimax multi-period substitutable resources production-allocation problem. Also, we develop a method to solve the formulated model.

2 Objectives

In section 2, we present a literature model to motivate this work. In section 3, we formulate a model of the minimax multi-period substitutable resources production-allocation problem. In section 4, we develop a method to solve the formulated model. In section 5, we present an experimental results. In section 6, we conclude this paper and we propose future research.

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