

Solving Time Minimizing Transportation Problem by Zero Point Method

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ABSTRACT - In this paper we are study on Time Minimizing Transportation Problem for Albert David Company Mandideep. The object of this problem is minimizing the transportation time of goods which supply from one source to another source. In this paper we are using zero point method [1,2] to solving time minimizing transportation problem and compare the obtained results with the regular methods, which is solve by Tora Software to get feasible solution and we find that zero point method is best from another method.

Keywords - Feasible solution, Optimal solution, Tora Software, Time Minimizing Transportation Problem

I. INTRODUCTION

The time minimizing transportation problem is a special case of a transportation problem in which a time associated with each shipping route. Rather than minimizing cost, the objective is to minimize the maximum time to transport all supply to the destinations. In a time minimizing transportation problem, the time of the transporting items from origins to destinations is minimized, satisfying certain conditions in respect of availabilities at sources and requirements.

The problem of minimizing the total transportation has been studied since long and is well known. In a time transporting goods is minimized to satisfy certain condition in respect of availabilities at sources and requirement at destinations. The basic difference between cost minimizing and time minimizing transportation problem is that the cost of transportation change with variations in the quantity but the time involved remains unchanged and irrespective of the quantities. The time minimizing transportation problem has been studied by Hammer[3], Garfinkel and Rao[4], Swarup[5], Bhatia, Swarup and Puri[6], Sharma and Swarup[7], Seshan and Tikkar[8]. Most of the models developed for solving the transportation problem are with the assumption that the supply, demand and the cost per unit values are exactly known. But real world applications, the supply, the demand and the cost per unit of quantities are generally not specified precisely i.e. the parameter are not complete. But even with incomplete information, the model user is normally able to give a realistic interval for the parameters.

Zero point method used by P Pandian and G Natrajan [1,2] to finding the optimal solution and fuzzy optimal solution to reduced transportation cost of transportation problem and fuzzy transportation problem respectively. In this paper we are using zero point method to solve time minimizing transportation problem to reduced transportation time for Albert David Company which is situated in Mandideep. Here our object is comparing the zero point method with regular method [9] of solving time minimizing transportation and we are using different -2 method to get feasible solution which is solve by Tora software.

II. MATHEMATICAL TIME MINIMIZING TRANSPORTATION PROBLEM

In a time transportation problem, the time of transporting goods from m origins to n destinations is minimized, satisfying certain condition in respect of availability at sources and requirements at the destinations.

Thus the time minimizing transportation problem is:

Minimize $Z = [\text{Max}_{(i,j)} t_{ij} \cdot x_{ij} > 0]$

Subject to $\sum_{j=1}^n x_{ij} = a_i, \quad i = 1, 2, 3, \dots, m$

$\sum_{i=1}^m x_{ij} = b_j, \quad j = 1, 2, 3, \dots, n$

$x_{ij} \geq 0$

Here t_{ij} is the time of transporting goods from the i th origin, whose availability is a_i , to the j th destination, where the requirement is b_j . For any given feasible solution, $X = [x_{ij}]$ satisfying (1), the time of transportation is the maximum of t_{ij} among the cells in which there are positive allocations, i.e., corresponding to the solution X , the time of transportation is

$$[\text{Max}_{(i,j)} t_{ij} \cdot x_{ij} > 0]$$

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