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GOAL PROGRAMMING APPROACH IN PROFIT MAXIMIZATION OF SOLID FRACTIONAL TRANSPORTATION PROBLEM WITH INTERVAL TYPE-2 FUZZY NUMBERS

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Abstract. In this paper, the authors formulated a goal programming approach for a solid fractional transportation problem. Here two objective functions are used, one is to maximize the profit, whereas the other is to minimize the transportation time. Also type-2 fuzzy numbers are mentioned in Model-I and Model-II, all parameters are considered as trapezoidal interval type-2 fuzzy numbers. An illustrative numerical example is provided to demonstrate the feasibility of the approach.

Keywords. Transportation Problem, Goal Programming, Solid Fractional Transportation Problem, Trapezoidal Fuzzy Number, Type-2 Fuzzy Number.

AMS (MOS) subject classification: 05C72, 90C32, 90C70.

1 Introduction

Transportation problem is a well-known optimization problem in operational research and was first developed by Hitchcock [7]. It plays an important role in logistics and supply chain management for improving service and reducing cost. It is a special type of linear programming problem, because of its special structure the usual simplex method is not suitable for solving transportation problems. These problems require a special method of solution. Transportation problems can be classified into different groups based on their main objective and origin supply versus destination demand. Transportation problems whose main objective is to minimize the cost of shipping goods are called minimizing. An alternative objective is to maximize the profit of shipping goods, in which case the problems are called maximizing. In a case where the supply of goods available for shipping at the origins is equal to the demand for goods at the destinations, the transportation problem is called