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FRACTIONAL PLUS FRACTIONAL CAPACITATED TRANSPORTATION PROBLEM WITH ENHANCED FLOW

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ABSTRACT. This paper presents an algorithm to solve a fractional plus fractional capacitated transportation problem with enhanced flow (EP). A related transportation problem (RTP) is formed and it is shown that to each corner feasible solution to (RTP),there is a corresponding feasible solution to enhanced flow problem (EP). An optimal solution to (EP) is shown to be determined from an optimal solution to (RTP). A numerical example is given in support of the theory and is verified by using a computing software Excel Solver.

Keywords: capacitated, transportation problem, optimal solution, feasible solution, enhanced flow, related transportation problem.

AMS Subject Classification: 90C08; 90B06

1. INTRODUCTION

The standard transportation problem is concerned with transporting at a minimum cost, a homogeneous commodity from each of the factories (or origins) to a number of markets (or destinations). Quite frequently, it may so happen that there is an extra demand in the markets for the commodity. In order to meet this extra demand, the factories have to increase their production. The total flow from the factories to the markets is now enhanced by the amount of extra demand. The standard transportation problem has now no longer transportation structure because of this flow structure. Enhanced flow problems have been studied by many researchers in the past years. Khurana and Arora [9] have studied enhanced flow and restricted flow in a sum of linear and linear fractional transportation problem. Khanna [8] discussed impact of extra flow in a linear transportation problem in 1982. In 2011, Khurana and Arora [10] presented an algorithm to solve a fixed charge bi-criterion indefinite quadratic transportation problem with enhanced flow. Gupta and Arora [6] studied enhanced flow constraint in a capacitated fixed charge indefinite quadratic transportation problem.

Another important class of transportation problems consist of capacitated transportation problems where the decision variables are bounded. Many researchers like Dahiya and Verma [1] , Das et.al. [3], Gupta and Arora [4, 5] have contributed a lot in this field. Dan et.al. [2] discussed paradox in sum of a linear and linear fractional transportation problem. Joshi and Gupta [7] have studied linear fractional transportation problem with varying demand and supply. Xie et. al. [11] studied both duration and cost optimization

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