ABSTRACT

In this thesis some fuzzy programming methods for solving the multi-objective transportation and trans-shipment problems are presented. At first the multi-objective linear and nonlinear transportation problems are considered. A fuzzy programming approach with some nonlinear membership functions is used to solve the problems. It is shown that, the methodologies which are presented will give optimal compromise solutions to the stated problems. Then a mathematical model of a multi-objective probabilistic transportation problem is presented. Only demand parameters of the transportation problems are assumed as certain known random variables. Then using their probability distributions the probabilistic transportation problem is transformed into a deterministic transportation problem. The problem is solved by using fuzzy programming method with Pareto optimum solution. Then the mathematical models of some multi-objective stair-case transportation problems are considered. The applications of the stair-case transportation problems are also presented. A similar fuzzy programming method is used to solve the problems. Mathematical model of a multi-objective trans-shipment problem is also presented. The importance of the trans-shipment models in private industry and public sectors is discussed. Then the problem is solved using linear and nonlinear membership functions. The solutions are also compared with the solutions obtained by the weighting method by setting equal weights to the objective functions. Finally, in order to estimate the weights of the objectives of a multi-objective transportation problem, fuzzy Analytic Hierarchy Process is applied. Lastly, a brief conclusions of the work and the scope for future research are presented.

Keywords : Multi-objective Programming, Fuzzy Programming, Pareto Optimum Solution, Linear and Nonlinear Membership Function, Fuzzy Numbers, Analytic Hierarchy Process, Weighting Methods, Non-inferior Solution, Probabilistic Transportation Problem, Stair-case Transportation Problem, Trans-shipment Problem, Nonlinear Transportation Problem.