

Abstract

The dissertation deals with some real life virgin for single/multi-item transportation and solid transportation problems in crisp, fuzzy and type-2 fuzzy environments. Some marketing decisions such as quantity of the transportation, path/route of the transportation, etc along with some other managerial insights are presented. Altogether, there are seven solid transportation problems along with Introduction, Solution Methodology, Summary and Future Extension and Bibliography. Above problems have been solved by different non-linear optimization techniques like Generalized Reduced Gradient method (using LINGO 9.0, LINGO 11.0 software), Genetic Algorithm(GA), Multi-objective Genetic Algorithm(MOGA) and Fuzzy Programming Technique.

In this dissertation the following key features are introduced: (i) The transportation system is split into two stages:(a) from the origin(s) to the near by station(s) of the destination(s) and (b) from the near by station(s) to the exact destination(s). The unit transportation cost is considered with all unit discount(AUD) policy. (ii) A two-staged transportation problem has been considered for breakable items with safety cost. (iii) A fuzzy solid transportation problem has been solved using modified Vogel's approximation method where different operations and comparisons of the two fuzzy numbers are made by using rank of the fuzzy number. (iv) A solid transportation problem is considered where unit transportation cost depends with the distance of transportation and quality of items. (v) A solid transportation problem is considered for substitutable items. The demands of the items are substitutable. The process of substitution has been discussed by fuzzy logic. (vi) Here, a *STP* is considered with non-linear transportation cost where unit transportation cost decreases at an inverse exponential rate if the transported amount increases. The model is formed and solved through different type-2 fuzzy operations. (vii) Based on Extension principle, a two level fuzzy programming technique has been introduced.