ABSTRACT

In today’s highly competitive market, the pressure on organizations to find better ways to create and to deliver value for customers become stronger. How and when to send the products to the customers in the quantities, in a cost-effective manner, becomes more challenging. Transportation models provide a powerful framework to meet this challenge. Transportation models ensure the efficient movement and timely availability of raw materials and finished goods.

This thesis is devoted to find the optimized value of the transportation problems with the new method, zero suffix method. This optimized value can be found directly without finding initial basic feasible solution, which requires least iterations to reach optimality, compared to the existing methods of optimization available in the literature. The degeneracy problem is also avoided by this proposed method. For this proposed method an algorithm was constructed using C# Net program.

One among the fuzzy techniques, which have the capability to analyze subjective and uncertain matters, fuzzy set theory is an extremely useful tool for analyzing transportation problems. To amplify the strength of the fuzzy approach for analyzing transportation problems, several critical issues related to fuzzy techniques were reviewed, and existing fuzzy methods were adapted for analyzing the transportation problems. This new method included procedure to determine fuzzy membership functions and to generate
fuzzy rules. To develop these fuzzy approaches for transportation problem analysis, several details related to how each of the fuzzy approaches are applied were investigated.

This new proposed method can also be used in Fuzzy Cost Minimizing Transportation Problems (FCMTP) and in Multi Objective Fuzzy Cost Minimizing Transportation Problems (MOFCMTP) to find the optimized value in which the demands and supply quantities are triangular fuzzy numbers. They are also found to require least iterations to reach optimality. This dissertation also details the procedures followed to accomplish these tasks. A new method namely, Separation Method is applied to find an optimal solution for Interval Integer Transportation Problems where transportation costs, supplies and demands are intervals. Separation method was developed without using the midpoint and width of the interval in the objective function of the interval transportation problem which is a non-fuzzy method. The proposed method is also based on Zero Suffix Method.

The main concepts discussed in thesis are Single-Objective Cost Minimizing Transportation Problems, Fuzzy Transportation Problems, Multi-Objective Two Stage Fuzzy Transportation Problems and Interval Integer Transportation Problems. Finally a comparison is made between Modified Distributed Method (MODI) with Zero Suffix Method (ZSM) and output is represented in graphical form. In this comparison, the success rate for the ZSM is greater than the MODI method. This new proposed method may also be applied to solve Assignment Problems and Travelling Salesman Problems in future.