ABSTRACT

The fixed charge transportation ‘FCT’ problem is an extension of the classical transportation problem in which two kinds of cost are involved: a continuous cost that linearly increases with the amount transported between a source and a destination and secondly, a fixed charge, that incurs whenever there exists a transportation of a non-zero quantity between a source and a destination. The FCT problem continues to be an active area of transportation research. Concerning the above, this thesis addresses four FCT models of practical significance. They are:

- Model – 1 : Single-Stage General FCT problem
- Model – 2 : Two-Stage Supply Chain ‘SC’ transportation problem associated with a fixed charge.
- Model – 3 : Single-Stage Truck Load Constrained Fixed Charge Transportation ‘TLC-FCT’ problem
- Model – 4 : Two-Stage TLC-FCT problem of a SC.

FCT problems are much more difficult to solve due to the presence of fixed costs, which cause discontinuities in the objective function and are known to be Non-Polynomial ‘NP’ hard. In recent years, Genetic Algorithm ‘GA’ and Simulated Annealing Algorithm ‘SAA’ has been increasingly applied to various search and optimization problems and has emerged as potential techniques to provide solutions with acceptable accuracy for NP hard problems. In the light of the above consideration, this thesis proposed GA and SAA based heuristics to evolve optimal or near-optimal solution for
the above four FCT models for minimization of total cost of transportation. The proposed GA and SAA are evaluated for its solution quality by comparing it with the approximate and lower bound solutions. Thus, the comparison reveals that the proposed GA and SAA generates better solution than the approximation method and are capable of providing solution either equal or closer to the lower bound solution of the problem.