A NOVEL METHOD FOR FINDING OPTIMAL SOLUTION TO TRANSPORTATION PROBLEMS

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The transportation problem is a special type of linear programming problem and it is a critical optimization issue encountered in numerous industries, including logistics, supply chain management, manufacturing, and even in public services. It aims to minimize the cost of transporting goods from several supply points to various demand locations. Conventionally, methods like Modified Distribution (MODI) method and the Stepping stone method are employed to find optimal solutions. However, both of these methods require the determination of an initial basic feasible solution before optimality is checked. So, conventional methods can be time-consuming as they consist of iterations for initial basic feasible solution and iterations for optimality check. This research introduces a novel method for solving transportation problem that directly finds the optimal solution without requesting for an initial basic feasible solution. This method can be applied to both balanced transportation problems, where the total supply equals the total demand, and unbalanced transportation problems, where there is a difference between total supply and total demand. The proposed method reduces computational complexity and offers few iterations to optimality, making it suitable for large transportation systems. We have tested the proposed approach using numerical examples and compared the results with the optimal solution obtained using Vogel Approximation Method (VAM) and MODI method. We used VAM for finding initial basic feasible solution and MODI for the optimality check. The results also checked with the optimal solution obtained from a software "TORA". All strategies yield the same optimal solution, validating the accuracy and efficiency of the proposed method. This method requires a simple arithmetical and logical calculation making the proposed approach easier even for a layman to understand and use. Further, the proposed method will be very lucrative for the decision-makers who are dealing with logistics and supply chain-related issues.

Key words: MODI method, TORA software, Transportation problem.