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# An Improved Discrete Version of Teaching–Learning-Based Optimization for Supply Chain Network Design

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**Abstract :** While there are several metaheuristics and exact approaches to solving the Supply Chain Network Design (SCND) problem, there still remains an unfilled gap in using the Teaching-Learning-Based Optimization (TLBO) algorithm. The algorithm has demonstrated desirable results with problems with complicated combinational optimization. The present study introduces a Discrete Self-Study TLBO (DSS-TLBO) with priority-based solution representation that can solve a supply chain network configuration model to lower the total expenses of establishing facilities and the flow of materials. The network features four layers, namely suppliers, plants, distribution centers (DCs), and customer zones. It is designed to meet the customer's demand through transporting the material between layers of network and providing facilities in the best economic Potential locations. To have a higher quality of the solution and increase the speed of TLBO, a distinct operator was introduced that ensures self-adaptation (self-study) in the algorithm based on the four types of local search. In addition, while TLBO is used in continuous solution representation and priority-based solution representation is discrete, a few modifications were added to the algorithm to remove the solutions that are infeasible. As shown by the results of experiments, the superiority of DSS-TLBO compared to pure TLBO, genetic algorithm (GA) and firefly Algorithm (FA) was established.

**Keywords :** supply chain network design, teaching–learning-based optimization, improved metaheuristics, discrete solution representation
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