Mathematical Modeling and Algorithms for the Capacitated Facility Location and Allocation Problem with Emission Restriction

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Abstract : In supply chain management, network design for scalable manufacturing facilities is an emerging field of research. Facility location allocation assigns facilities to customers to optimize the overall cost of the supply chain. To further optimize the costs, capacities of these facilities can be changed in accordance with customer demands. A mathematical model is formulated to fully express the problem at hand and to solve small-to-mid range instances. A dedicated constraint has been developed to restrict emissions in line with the Kyoto protocol. This problem is NP-Hard; hence, a simulated annealing metaheuristic has been developed to solve larger instances. A case study on the USA-Canada cross border crossing is used.
Keywords : emission, mixed integer linear programming, metaheuristic, simulated annealing

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