Heuristic Approaches for Optimizing Multi-echelon Multi-facility Green Reverse Logistics Network Design

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Abstract

In recent years, reverse logistics (RL) has received considerable attention due to business and environmental factors. The environmental context has driven many organizations to invest in green technologies, with a recent emphasis on reducing greenhouse gasses (GHG) emission. This research proposes a mixed integer linear programming model to a multi-echelon reverse logistics network design problem with multi-facility while taking account of GHG emissions. The proposed model aims at minimizing the total cost of an organization which mainly includes production, emission costs, and transportation cost and recovery cost. To consider variations in future in the network configuration; we incorporated the dynamic nature of the cost parameters. Since such network design problems are NP-hard problems, we proposed an enhanced benders decomposition algorithm to find the near optimal solution. We also compare the numerical results through exact solutions solved using IBM ILOG CPLEX 12.5.

Keywords
Reverse Logistics, Carbon emissions, Heuristics

Biographies

K Nageswara Reddy is the Doctoral Student in Department of Industrial and Systems Engineering at Indian Institute of Technology, Kharagpur, India**.** He has published journal and conference papers. His publications appeared in such journals as International Journal of Production Economics, International Journal of Production Research and European Journal of Operational Research. His research interests include operations research (optimization), transportation, logistics and supply chain management. He is a member of IEOM, INFORMS, IISE, POMS and IEI.

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