

Scheduling of Cross-Docking Center: An Auction-Based Algorithm

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Abstract : This work proposes an auction mechanism based solution methodology for the optimum scheduling of trucks in a cross-docking centre. The cross-docking centre is an important element of lean supply chain. It reduces the amount of storage and transportation costs in the distribution system compared to an ordinary warehouse. Better scheduling of trucks in a cross-docking center is the best way to reduce storage and transportation costs. Auction mechanism is commonly used for allocation of limited resources in different real-life applications. Here, we try to schedule inbound trucks by integrating auction mechanism with the functioning of a cross-docking centre. A mathematical model is developed for the optimal scheduling of inbound trucks based on the auction methodology. The determination of exact solution for problems involving large number of trucks was found to be computationally difficult, and hence a genetic algorithm based heuristic methodology is proposed in this work. A comparative study of exact and heuristic solutions is done using five classes of data sets. It is observed from the study that the auction-based mechanism is capable of providing good solutions to scheduling problem in cross-docking centres.

Keywords : auction mechanism, cross-docking centre, genetic algorithm, scheduling of trucks

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