



# A First-Come, First-Served Basis Heuristic Approach to Scheduling Inbound Vehicles at a Warehouse with Multi-Receiving Doors

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**Abstract:** In a warehouse with a single-door, the scheduling is only a matter of sequencing the vehicles to that door. This study focuses on scheduling vehicles to a warehouse with multi-doors. Therefore, sequencing and assigning vehicles to the doors are taken into consideration. The proper scheduling of the vehicles to the doors at a warehouse is categorized as an NP-hard problem in the field of Operations Research. Hence, traditional methods are not appropriate for solving large-scale NP-hard problems as, in many cases, traditional methods fail to converge to an optimal solution. Therefore, a non-traditional First Come, First Served basis Heuristic Approach (FCFS-HA) is proposed to solve the large-scale instances of the Inbound Vehicle Scheduling Problem (IVSP). The objectives of this study are to validate the proposed FCFS-HA and check the feasibility of reaching optimal solutions to the large-scale instances of the IVSP. A Mixed Integer Linear Programming (MILP) model is developed for the IVSP to minimize the 'waiting time' of the inbound vehicles at the warehouse. First, the developed MILP model is coded in LINGO optimization software. Then the Branch and Bound algorithm is chosen to obtain the exact optimal solution. Second, the FCFS-HA is employed to solve the MILP model for the IVSP. Consequently, the FCFS-HA is programmed in the MATLAB platform. The numerical experiments of randomly generated small-scale instances of the IVSP reveal that the solution obtained by the FCFS-HA has a maximum deviation of 9% from the exact optimal solution. Since the accuracy of the proposed FCFS-HA is over 97% on average, it can be concluded that the FCFS-HA is a far better method over to the traditional methods in terms of the solution accuracy and computational efficiency to solve the IVSP.

**Keywords:** Inbound vehicles, Multi-door warehouse, Vehicle scheduling.