



ABSTRACT

Paper title: Vehicle Routing in Reverse Logistics

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Abstract:

Strong competition has forced many businesses to abandon old logistics practices and switch to new ones. Traditionally, companies concentrated on the forward movement of goods in the supply chain. With the increasing flow of products going backward in the chain, companies have to pay attention to reverse logistics as well, as they may significantly reduce the cost of returned merchandise, improve customer satisfaction, and therefore increase the enterprise profit.

Many customers having both a pick-up and delivery demand prefer to be served with a single stop (instead of separately for the delivery and pick-up) because of the reduced transport cost and increased customer satisfaction. This situation can be called the vehicle routing problem with simultaneous delivery and pick-up (VRPSDP). The VRP is known to be an NP-hard problem (Golden et al., 1981) and, as the VRPSDP is a particular type of VRP, Min (1989) concluded it too is an NP-hard problem. This kind of problem concerning transport and logistics has been identified as special research elements that have not received sufficient attention in the past. This paper will present a model in solving the VRP with simultaneous delivery and pick-up. The hard constraint is allocation of orders to each vehicle cannot exceed the corresponding load capacity and the soft constraint is that vehicle arrival at each customer should be within a preferred time period. The objective of the problem is to minimise the number of soft constraint violations in a feasible solution as well as minimise the total transport cost. A sample data of eight customers and one warehouse in a small scale grid network will be used to test the model. This model will investigate the difference in solution for the VRP with forward and backhaul simultaneously and the VRP without considering backward movement.

References

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