An exact method for the stochastic inventory routing problem

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ABSTRACT

Vendor inventory management is a concept which is adapted highly nowadays where the decision maker in the process is the retailer. The combination of the inventory management with the vehicle routing problem constitutes one of the latest trends of logistics and vendor managed inventory systems. Also as new emerging technologies are introduced in the context of Freight Transportation Systems, research requires the development of new models and algorithms that can incorporate their advantages. Dynamic and stochastic inventory routing is a methodological approach that seems to be capable to account for inherent uncertainties to the freight system.

In this context, this paper aims to discuss all significant elements of dynamic and stochastic inventory routing problem. Since we are investigating the stochastic counterpart of the problem stock out are unavoidable. Following the exact method proposed by Archetti which was also extended by Coelho using transshipment we are incorporating backorder penalty costs in order to include the stock out occurrence as well. New valid inequalities are introduces which was used to the branch and cut approached that was followed. Results of the proposed approach are evaluated on the extended set of instances proposed by Archetti et al. (2007) for the single vehicle – single commodity inventory – routing problem by introducing the backorder penalty cost as well.

The overall goal of this approach is to identify new solution policies to be applied that incorporate probabilistic knowledge of future information.

References

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