A stochastic lot-sizing model with multi-supplier and quantity discounts

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Abstract

This research considers a stochastic lot-sizing problem with multi-supplier and quantity discounts. The
objectives are to minimise total costs, where the costs include ordering cost, holding cost, purchase cost and
shortage cost, and to maximise service level of the system. In this paper, we first formulate the stochastic lotsizing
problem as a multi-objective programming (MOP) model. We then transform the model into a mixed
integer programming (MIP) model. Finally, an efficient heuristic dynamic programming (HDP) model is
constructed for solving large-scale stochastic lot-sizing problems. An illustrative example with two cases for a
touch panel manufacturer is used to illustrate the practicality of these models, and a sensitivity analysis is
applied to understand the impact of the changes in parameters to the outcomes. The results demonstrate that
the proposed two models are effective and accurate tools for determining the replenishment of touch panels
from multiple suppliers for multi-periods.