
Minimization of the total cost for a single supplier two-customers integrated inventory-delivery problem

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Résumé

Considerable attention had previously been given to the single-vendor single-buyer integrated inventory problem, but there had been very little work on the integrated single-vendor multi-buyer case. In this case, some researchers have synchronized the single-vendor multi-buyer integrated inventory supply chains by transferring the lot either with equal-sized or with unequal-sized sub-lot (batches). But, the method of synchronizing between one customer and two vendors while accumulating the inventory of each of buyer, with liberal-sized limited capacity transporters have not been studied. Here we develop a generalized single-vendor two-buyers supply chain model with one transporter available to deliver the identical products from the customer to the buyers. the delivery times and the costs are varied from one customer to the other. Two models are developed, in the first assumption, the transporter serves every buyer separately and in the second assumption, the transporter delivers to the two buyers consecutively. In both assumptions, jobs are first processed in the production stage, and then gathered in batches. The resource of products is a number of available machines that produce according to a simple customer command. Each job has a due date specified by the buyers. Moreover, it is supposed that a job that arrives at the customer before its due date will incur a customer inventory cost. The objective is to compare the two different proposed methods by finding the minimized total cost, while guaranteeing a certain customer service level.

A mathematical formulation of the problem is given as a nonlinear model in a general way. We formulate the problem as a Mixed Integer Programming (MIP) model and propose a heuristic algorithm to solve it. The results of the two different methods are compared to show the efficiency of the proposed heuristic.

Mots-Clés: Integrated vendor, buyers model, Production and Distribution, Mixed integer programming, inventory

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