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整数比策略下含变质产品且缺货部分需补的VMI模型

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Vendor managed inventory model with deteriorating items and partial backlogging under integer ratio strategy

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摘要 在不考虑原材料变质而产品变质且订货商处缺货部分需补的集成供应商管理库存(VMI)系统中, 由于生产准备成本的影响, 供应商采用批对批策略生产产品不一定最优, 因此文中允许供应商采购原材料和生产产品均采用整数比策略, 即一次采购的原材料分整数次生产, 一次生产的产品分整数次给订货商供货, 建立了包含一个供应商和一个订货商的VMI模型. 通过基于遗传算法设计的求解步骤得到了一次采购的原材料用于生产产品的次数, 一次生产的产品给订货商供货的次数、供货间隔期以及订货商处的服务水平等决策变量的值. 算例结果表明: 供应商采用整数比策略采购原材料和生产产品可得到VMI系统最小单位时间总成本的满意解; 进一步的分析表明生产准备成本、产品变质率、丢单系数等各自的变化均会对供应商的生产决策以及VMI系统最小单位时间总成本产生影响.

关键词: 整数比策略　变质产品　缺货部分需补　遗传算法　VMI

Abstract： We give a single vendor and single buyer VMI model in which raw materials are no deteriorating, items are deteriorating and buyer faces partial backlogging for unmet demand. It's not necessarily the best optimal way that vendor employs lot-for-lot strategy to yield items for the impact of setup cost. Therefore, we allow that vendor employs integer ratio strategy to procure raw materials and yield items, which means that each batch of raw materials procurement meet integer time of production, and each batch of items yield meet integer time of replenishment to buyer. We get these decision variables of time that meet production of each batch of raw materials procurement, time that meet replenishment to buyer of each batch of items yield, replenishment interval and buyer's service level by solving steps based on genetic algorithm. The result of numerical example indicates that the VMI system can get the satisfied solution of minimum per unit time total cost when vendor employs integer ratio strategy to procure raw materials and yield items. The respective change of setup cost, deterioration rate and losing sale ratio has an affect on vendor decision to produce and the minimum per unit time total cost of VMI system.

Key words： integer ratio strategy　deteriorating items　partial backlogging　genetic algorithm　VMI

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