

带时变生产成本的易变质经济批量模型的最优策略分析

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An optimal solution for economic production quantity models with deteriorating item and time-varying production cost

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摘要 考虑了具有时变生产成本的易变质产品经济批量模型. 有限计划期内, 单位生产成本、生产率以及需求率假定为时间的连续函数, 生产固定成本则具有遗忘效应现象. 当不允许缺货时, 建立了以总成本最小为目标的混合整数优化模型并证明了此问题最优解的相关性质. 对于此问题的特殊情形, 将成本函数中的离散型变量松弛为连续型变量, 通过分析其最优解的存在性及唯一性, 求解了此最优解, 将其作为初始值设计了求取一般情形最优解的有效算法. 最后通过算例验证了理论结果的有效性.

关键词: 运筹学 库存模型 凸函数 易变质 时变成本

Abstract: A generalized economic production quantity model with deteriorating items over a finite planning horizon is considered in this paper. The unit production cost, the production rate and the demand rate are assumed to be known and continuous functions of time, and the forgetting effect of setup cost is incorporated into the problem. Shortages are not allowed in this model. A mixed-integer constraint optimization mathematical model in which the objective is to minimize the total cost is established and the conditions of the optimal solution for this problem are derived. A discrete variable in the total cost function is relaxed to the continuous variable and this technique is used to prove the uniqueness and optimality of the optimal solution for a special case. In addition, the optimal solution of the special case is regarded as the initial condition to simplify the search process of finding the optimal solution of the generalized problem. Finally, a numerical example is provided to illustrate the results.

Keywords: operations research, inventory model, convex function, deterioration, time-varying cost

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