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产品创新开发技术

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集成供应商选择的产品族设计多目标方法

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Multi-objective approach for product family design with integration of supplier selection

摘要 图/表 参考文献 相关文章 (15)

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摘要 为避免将产品族设计和供应商选择过程分割而导致不可行或非最优的产品开发方案,以及从多角度对产品族优化设计方案进行评估和权衡,提出一个集成供应商选择的产品族设计多目标优化方法,并建立了一个以最大化产品族总利润和最小化产品族生产风险为多目标的优化模型。在该模型中考虑了产品情感属性对消费者选择行为的影响,以更准确地分析消费者的购买偏好、实现产品族的优化过程。针对优化问题,采用非支配排序遗传算法对模型进行求解。通过实际案例说明了所提优化方法和求解算法的可行性和合理性。

关键词 : 产品族设计, 供应商选择, 非支配排序遗传算法, 多目标优化

Abstract : To avoid the infeasible or suboptimal product development schemes resulting from separating the process of product family design and supplier selection, and to evaluate the design scheme of product family design from multiple perspectives, a new multi-objective optimization approach for integrating supplier selection into product family design was proposed, and a multi-objective mathematical model with objectives of maximizing the total profit and minimizing the supply risk of a product family was established. Meanwhile, the influence of product affective attributes on consumer choice behavior was considered in the model to more accurately analyze consumer preferences and optimize product family. Non-dominated sorting genetic algorithm was developed to solve the established optimization model and a case study was conducted to illustrate the feasibility and rationality of proposed approach and algorithm.

Key words : product family design supplier selection non-dominated sorting genetic algorithm multi-objective optimization

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