

系统工程

基于Bayes理论与Monte Carlo模拟的风险型多属性群决策方法

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摘要:

针对方案属性值为随机变量、属性权重未知的风险型多属性群决策问题, 根据决策者有无先验信息、专家估计方差是否可知等情形, 提出了两类集结决策者和专家主观概率的多元Bayes模型。这些模型先将群体对属性值的估计集结成单一分布, 然后用Monte Carlo模拟的方法, 通过计算每个方案的排名期望值, 得到各方案的排序。给出了应用该方法的具体步骤, 实例分析验证了方法的有效性和实用性。

关键词: 群决策 风险型多属性决策 Bayes理论 Monte Carlo模拟

Risky multicriteria group decision approach based on Bayesian theory and Monte Carlo simulation

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Abstract:

Aiming at the risky group decision making problem with a stochastic variable and unknown weight, two models of combining decision maker's and expert's subject probability are presented based on Bayesian theory, according to whether the decision maker has prior information and whether the expert's deviation is known. With those multivariate Bayesian aggregation models, a consensus probability distribution of each criterion's value is attained first. Then, by means of Monte Carlo simulation, a rank probability exception index is calculated which represents the probability of different ranks an alternative might get. Finally, an exception ranking score is defined as well, which can aid a decision maker to choose the best alternative. The solution procedure is given and the effectiveness of this approach is showed by an example.

Keywords: group decision risky multicriteria decision Bayesian theory Monte Carlo simulation

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