

# Use of Interval-Based Multi-criteria Decision Making in the Pricing Problem

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## **Abstract**

Intelligent techniques are very useful tools for solving problems that involve understanding, modeling, and analysis of large data sets. One of the numerous fields where computational intelligence has found an extremely important role is finance. One such problem of interest for the computational intelligence community is the pricing, specially the Ramsey-Boiteux pricing.

The Ramsey pricing in general, is a policy concerning what price should be set, in order to maximize social welfare, subject to a constraint on profit. It means, given some attributes of a product, it needs to be priced in such a way that it guarantees maximum profit. This has relevance in todays commercial and economical environment since setting up the right price can maximize the social welfare. This problem is tackled mostly by differential equations or integration techniques (like Lagrange multiplier technique). Even though these methods provide good and usually fast approximation of the best pricing strategy, they suffer from some common drawbacks including the negligence of the dependence among demands of goods, and the assumption that all available data are precise and certain. Furthermore, the Lagrange multiplier technique gives the local optimal solution which might not be the global optimal one.

Interval based Multi-criteria Decision Making (MCDM) can be used to face these weaknesses. Researchers have shown that the interval based MCDM gives a natural way of ordering intervals of preferences that is in agreement with intuitive behavior of the decision maker. Moreover the problem with the results obtained using Lagrange multiplier technique regarding local optimality is also resolved with global optimal solution obtained using interval based MCDM, therefore improving the quality of the results. However, the question, whether this technique improves efficiency and accuracy of the solution to the pricing problem, remains to be evaluated.

To address this issue experimental measurements will be performed to do the time-complexity analysis of the proposed approach and then to compare it to the Lagrange multiplier technique, the traditional approach to solve the Pricing problem.