World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:01, 2020

# Optimization of the Measure of Compromise as a Version of Sorites Paradox

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**Abstract :** The term ”compromise” is mostly used casually within the social choice theory. It is usually used as a mere result of the social choice function, and this omits its deeper meaning and ramifications. This paper is based on a mathematical model for the description of a compromise as a version of the Sorites paradox. It introduces a formal definition of d-measure of divergence from a compromise and models a notion of compromise that is often used only colloquially. Such a model for vagueness phenomenon, which lies at the core of the notion of compromise enables the introduction of new mathematical structures. In order to maximize compromise, different methods can be used. In this paper, we explore properties of a social welfare function TdM (from Total d-Measure), which is defined as a function which minimizes the total sum of d-measures of divergence over all possible linear orderings. We prove that TdM satisfy strict Pareto principle and behaves well asymptotically. Furthermore, we show that for certain domain restrictions, TdM satisfy positive responsiveness and IIIA (intense independence of irrelevant alternatives) thus being equivalent to Borda count on such domain restriction. This result gives new opportunities in social choice, especially when there is an emphasis on compromise in the decision-making process.

**Keywords :** borda count, compromise, measure of divergence, minimization
**Conference Title :** ICAMDS 2020 : International Conference on Applied Mathematics and Decision Sciences
**Conference Location :** Amsterdam, Netherlands
**Conference Dates :** January 20-21, 2020