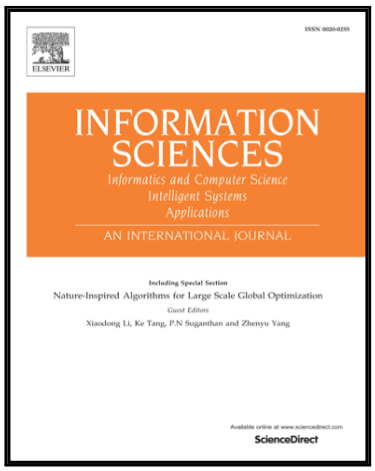


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# Multiple Attribute Decision Making Based on Interval-Valued Intuitionistic Fuzzy Sets, Linear Programming Methodology, and the Extended TOPSIS Method

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**Abstract**

In recent years, some multiple attribute decision making (MADM) methods have been presented based on interval-valued intuitionistic fuzzy sets (IVIFSs). In this paper, we propose a new MADM method based on IVIFSs, the linear programming (LP) methodology, and the extension of the technique for order preference by similarity to ideal solution (TOPSIS) method, where the LP methodology is used to obtain optimal weights of attributes. The proposed method can overcome the drawbacks of the existing methods for MADM in interval-valued intuitionistic fuzzy (IVIF) environments.

***Keywords:*** Interval-valued intuitionistic fuzzy sets; Linear programming methodology; Multiple attribute decision making; TOPSIS.

## 1. Introduction

Some multiple attribute decision making (MADM) methods [6], [7], [9]-[11], [16], [18], [21], [24], [26], [29], [31], [37], [40] and some multiple attribute group decision making (MAGDM) methods [4], [5], [8], [14], [27], [28], [32], [38], [39] have been presented based on interval-valued intuitionistic fuzzy sets (IVIFSs) [2], where IVIFSs are the generalization of intuitionistic fuzzy sets (IFSs) [1]. The membership value and the