**Response Letter for the Paper with ID: JAUIST-1128289**

We are grateful to the referees and editors for their comments and suggestions. The paper has been revised according to the comments. The blue text is new text, and the red is already in the paper. Moreover, we have added a Highlighted Paper showing the revisions.

**Reviewer #1:** The authors defined the concept of *ifpifs*-matrices to deal with uncertainties in decision making. The method provided has been designed successfully for significantly big data.

The authors make a good argument for why the concept is essential. Methodology in the paper is good. The results are well written and correct mathematically.

Thank you for the comments.

This paper may be accepted subject to the following minor corrections.

1. Abbreviations can be italic but should not be in equation form. For example, "\emph{ifpifs}-matrices" is much better than "$ifpifs$-matrices".

We have made the necessary revisions.

1. Add comparison of proposed methods with some existing decision-making approaches.

In Chapter 6, we already compare the proposed method EA20 with ten state-of-the-art methods. Therefore, we have made no revisions.

1. The motivation should be highlighted in the abstract and conclusion.

We have rearranged the abstract and conclusion.

**In Abstract**

This study aims to propose the concept of intuitionistic fuzzy parameterized intuitionistic fuzzy soft matrices (*ifpifs* -matrices) and to present several of its basic properties. Therefore, it would be possible to improve the problem-modelling capabilities of the available intuitionistic fuzzy parameterized intuitionistic fuzzy soft sets in the occurrence of a large number of data. Moreover, by using *ifpifs*-matrices, we suggest a new soft decision-making method, denoted by EA20, and apply it to a multi-criteria group decision-making (MCGDM) problem. We then compare the ranking performance of EA20 for five noise-removal filters with those of ten state-of-the-art soft decision-making methods. The results show that EA20 successfully models performance-based value assignment problems. Finally, we discuss *ifpifs*-matrices and EA20 for further research.

**In Conclusion**

… Moreover, we provided an application that assigned performance-based values to noise-removal filters. Since EA20 is the first method in $IFPIFS\_{E}\left[U\right]$, we present the *fpfs*-matrices therein in the form of *ifpifs*-matrices.

In the future, different soft decision-making methods can be developed by using operations of *ifpifs*-matrices, such as $R$-relative union/intersection/difference and and/or/andnot/ornot-products. Additionally, to model more severe uncertainties than the aforesaid, *ifpifs*-matrices can be expanded to interval-valued intuitionistic fuzzy parameterized interval-valued intuitionistic fuzzy soft matrices through the closed subintervals of $\left[0,1\right]$. Besides, defining the distance and similarity measurements of *ifpifs*-matrices can prove beneficial in such areas as medical diagnosis and pattern recognition.

1. Add input and output in the decision-making algorithm. Add more steps to explain your method. For example: In Step first add a set of objects, a set of attributes, set decision-makers (DMS). In Step last, find the optimal alternative.

We have further explained Step 1.

Construct two *ifpifs*-matrices $\left[a\_{ij}\right]\_{m× n}$ and $\left[b\_{ik}\right]\_{m× n}$ by considering the set of alternatives $U=\left\{u\_{1},u\_{2},...,u\_{m-1}\right\}$ and the parameters set $E=\left\{e\_{1},e\_{2},...,e\_{n}\right\}$.

Moreover, we have added Step 4.

Choose the most suitable alternatives $u\_{k}$ with respect to $μ\left(u\_{k}\right)$.

1. The literature review should be improved in the light of recent related articles:

Classification of the monolithic columns produced in Troad and Mysia Region ancient granite quarries in Northwestern Anatolia via soft decision-making.

Linear Diophantine Fuzzy Set and its Applications towards Multi-Attribute Decision Making Problems.

Hesitant fuzzy soft topology and its applications to multi-attribute group decision-making.

DOI: 10.1007/s40314-019-0989-z.

Doi.org/10.1007/s40314-019-0843-3.

We have added two of the suggested references.

@Article{eact19,

Author = "Engino\u{g}lu, S. and Ay, M. and \c{C}a\u{g}man, N. and Tolun, V.",

Title = "Classification of the monolithic columns produced in {T}road and {M}ysia {R}egion ancient granite quarries in {N}orthwestern {A}natolia via soft decision-making",

Journal = "Bilge Int J Sci and Tech Res",

Volume = "3",

Pages = "21--34",

Year = "2019"

}

@Article{rh19,

Author = "Riaz, M. and Hashmi, M. R.",

Title = "Linear {D}iophantine fuzzy set and its applications towards multi-attribute decision-making problems",

Journal = "J. Intell. Fuzzy Syst.",

Volume = "37",

Number = "4",

Pages = "5417--5439",

Year = "2019"

}

**Reviewer #2:**

1. Linguistic quality of the paper must be improved.

We have rechecked the paper carefully.

1. References to recent works and its elaborations, especially in MCDMS is not adequate in the introduction. It must be added. A brief description of the advantages of Intuitionistic fuzzy parameterized intuitionistic fuzzy soft sets and matrices over earlier ones must be mentioned in the introduction.

We have described the advantages of *ifpifs*-sets and *ifpifs*-matrices and added details about MCDMS and the recent related works thereon.

…For example, if six of the data produced by the detector $x$, which sends ten signals a second, are positive and four are negative, then this case is expressed with the fuzzy value $\mu(x)=0.6$. Since intuitionistic fuzzy sets are a generalization of fuzzy sets, intuitionistic fuzzy sets can model this problem with intuitionistic fuzzy value $\mu(x)=0.6$ and $\nu(x)=0.4$. However, if six of the data collected from the same detector are positive, three are negative, and one is corrupt, then this case cannot be expressed with fuzzy values but with an intuitionistic fuzzy value, i.e. $\mu(x)=0.6$ and $\nu(x)=0.3$. These examples too show that intuitionistic fuzzy sets are more useful than fuzzy sets. Moreover, in the presence of the data received from the detectors at different locations, soft sets are needed to attend to the problem of where to build a wind turbine. Therefore, fuzzy soft sets, fuzzy parameterized soft sets, and fuzzy parameterized fuzzy soft sets (\emph{fpfs}-sets), which are hybrid versions of fuzzy sets and soft sets, cannot overcome such a problem. To take advantage of intuitionistic fuzzy sets and soft sets and overcome the abovementioned drawbacks, some hybrid versions of intuitionistic fuzzy sets \cite{a86} and soft sets, such as intuitionistic fuzzy soft sets \cite{mbr01-2}, intuitionistic fuzzy parameterized soft sets \cite{dc15}, and intuitionistic fuzzy parameterized fuzzy soft sets \cite{ys13}, have been introduced.

Since more general forms are needed for mathematical modelling of some problems containing further uncertainties, Karaaslan \cite{k16-2} has propounded the concept of intuitionistic fuzzy parameterized intuitionistic fuzzy soft sets (*ifpifs*-sets). He has also proposed a soft decision-making method by using *ifpifs*-sets and applied this method to a decision-making problem. The application provided therein has demonstrated that *ifpifs*-sets can be successfully applied to some problems containing further uncertainties. As a result, the concept of *ifpifs*-sets has allowed to model situations with parameters and objects containing intuitionistic fuzzy uncertainties. Therefore, this concept is worth being studied. On the other hand, since such concepts pose some disadvantages, such as long-running time and complexity, it is of great importance to study their matrix representations.

In addition to the type of decision-making discussed in the present paper, the related literature incorporates many studies on multi-criteria group decision-making. To exemplify, Garg and Kaur \cite{gk20} have proposed an extended TOPSIS method for multi-criteria group decision-making problems in cubic intuitionistic fuzzy environment. Çalı and Balaban \cite{cb19} have presented a multi-criteria group decision-making method based on the integration of ELECTRE and VIKOR in the intuitionistic fuzzy environment. Enginoğlu and Arslan \cite{ea19} have suggested a decision-making method exploiting *ifpifs*-sets and have applied it to a recruitment scenario of a company. Büyüközkan and Göçer \cite{bg17} have propounded a new multi-criteria group decision approach using the intuitionistic fuzzy analytic hierarchy process method and the intuitionistic fuzzy axiomatic design principles. Nan et al. \cite{nwa16} have proposed a new extended TOPSIS by using an intuitionistic fuzzy distance measure.

1. Paper seems technically correct even though it is a direct generalization of already existing concepts.

Thank you for the comments.

**Reviewer #3:**

The paper is well-organized, and its topic is pretty interesting. I recommend this paper to be accepted in this journal.

Thank you for the comments.