Review of: "Improved Cosine Similarity Measures and Extended TOPSIS for q-Rung Orthopair Fuzzy Sets: Applications in Green Technology Selection"

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Potential competing interests: No potential competing interests to declare.

The study presents innovative cosine similarity measures tailored for q-rung orthopair fuzzy sets (q-ROFSs), which address limitations in traditional measures by incorporating a length difference control term. This enhancement is particularly valuable for handling overlapping vector representations with height differences, ensuring sensitivity to both direction and magnitude aspects. The effectiveness of these measures is demonstrated, showcasing their superiority over traditional counterparts and their ability to enhance existing measures for intuitionistic fuzzy sets and Pythagorean fuzzy sets. The measures consist of an average or Choquet integral of two components, quantifying cosine similarity and capturing differences in lengths between vector representations. This innovative approach ensures sensitivity to variations in both direction and magnitude, making the measures suitable for diverse applications. Additionally, the study extends its contributions to multi-criteria group decision making (MCGDM) through an extended TOPSIS methodology applied to green technology selection, with comparative analysis highlighting the effectiveness of the proposed approach. Overall, the study offers valuable insights and practical applications in fuzzy set representations and decision-making methodologies.