

Ranking stability under uniform preference intensification in pairwise comparison matrices

L.A. Calvo Pascual; J. Mazurek

Abstract-

This paper examines ranking stability in multiplicative pairwise comparison matrices under uniform preference intensification, represented by the entrywise power transformation $A \rightsquigarrow A^{(k)} = [\alpha^{k_{ij}}]$. The associated invariance requirement is known as scale invariance; here, we study its failure at the level of the induced ranking, referred to as intensity-of-preference rank reversal. We combine theoretical observations, illustrative examples, and Monte Carlo experiments to analyse how this phenomenon depends on matrix order, inconsistency, and the priority derivation method. The row geometric mean method is used as the known scale-invariant benchmark, since its ranking is preserved under uniform intensification. In contrast, the eigenvector method and several other commonly used procedures may change the induced ranking, including the top-ranked alternative. The simulations indicate that such instability becomes more frequent as the number of compared objects increases, persists even among matrices satisfying conventional consistency-ratio thresholds, and differs substantially across priority derivation methods. These results show that robustness to uniform preference intensification is distinct from consistency screening and should be considered separately when evaluating priority derivation methods.

Index Terms- Eigenvector method; Geometric mean method; Pairwise comparison matrices; Rank reversal; Uniform preference intensification

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Operations Research Perspectives, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Calvo, L.A.; Mazurek, J. "Ranking stability under uniform preference intensification in pairwise comparison matrices", *Operations Research Perspectives*, vol.17, pp.100406, December, 2026.