

Impossibility results for paired comparisons

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Abstract

In several decision-making problems, information is available on paired comparisons between the alternatives. An axiomatic approach for the general ranking problem with possible missing values and multiple comparisons is considered. Three natural requirements are:

- *Consistency*: if an object is preferred over another in two (sub)tournaments, then this relation should hold on the basis of the entire tournament;
- *Independence of irrelevant matches*: the relative ranking of two objects is not influenced by the outcome of paired comparisons between the other objects;
- *Self-consistency*: an object with a better performance is ranked higher.

Consistency together with two basic properties implies independence of irrelevant matches.

It is revealed that a self-consistent scoring procedure can satisfy neither consistency nor independence of irrelevant matches. We also discuss domain restrictions and weakening of the axioms in order to get a positive result.

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