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Axioms for centrality scoring with principal eigenvectors. (English) Zbl 1391.91082

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Summary: Techniques based on using principal eigenvector decomposition of matrices representing binary relations of sets of alternatives are commonly used in social sciences, bibliometrics, and web search engines. By representing the binary relations as a directed graph the question of ranking or scoring the alternatives can be turned into the relevant question of how to score the nodes of the graph. This paper characterizes the principal eigenvector of a matrix as a scoring function with a set of axioms. Furthermore, a method of assessing individual and group centralities simultaneously is characterized by a set of axioms. A special case of this method is the hyperlink-induced topic search for ranking websites. In general, the method can be applied to aggregation of preferences or judgments to obtain a collective assessment of alternatives.

MSC:

91B14 Social choice
15A18 Eigenvalues, singular values, and eigenvectors

Cited in **10** Documents

Keywords:

centrality scoring; principal eigenvector; Bonacich-Kleinberg scoring function

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