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A simple centrality index for scientific social recognition

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Abstract

We introduce a new centrality index for bipartite network of papers and authors that we call K -index. The K -index grows with the citation performance of the papers that cite a given researcher and can be seen as a measure of scientific social recognition. Indeed, the K -index measures the number of hubs, defined in a self-consistent way in the bipartite network, that cites a given author. We show that the K -index can be computed by simple inspection of the Web of Science platform and presents several advantages over other centrality indexes, in particular Hirsch h -index. The K -index is robust to self-citations, is not limited by the total number of papers published by a researcher as occurs for the h -index and can distinguish in a consistent way researchers that have the same h -index but very different scientific social recognition. The K -index easily detects a known case of a researcher with inflated number of papers, citations and h -index due to scientific misconduct. Finally, we show that, in a sample of twenty-eight physics Nobel laureates and twenty-eight highly cited non-Nobel-laureate physicists, the K -index correlates better to the achievement of the prize than the number of papers, citations, citations per paper, citing articles or the h -index. Clustering researchers in a K versus h plot reveals interesting outliers that suggest that these two indexes can present complementary independent information.

Keywords: Scientometrics, Hirsch index, Lobby index, complex networks, node centrality, citation network, Web of Science, social recognition, scientific prizes.

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