The measurement of low- and high-impact in citation distributions: Technical results

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ABSTRACT

This paper introduces a novel methodology for comparing the citation distributions of research units of a certain size working in the same homogeneous field. Given a critical citation level (CCL), we suggest using two real valued indicators to describe the shape of any distribution: a high-impact and a low-impact measure defined over the set of articles with citations above or below the CCL. The key to this methodology is the identification of a citation distribution with an income distribution. Once this step is taken, it is easy to realize that the measurement of low-impact coincides with the measurement of economic poverty. In turn, it is equally natural to identify the measurement of high-impact with the measurement of a certain notion of economic affluence. On the other hand, it is seen that the ranking of citation distributions according to a family of low-impact measures is essentially characterized by a number of desirable axioms. Appropriately redefined, these same axioms lead to the selection of an equally convenient class of decomposable high-impact measures. These two families are shown to satisfy other interesting properties that make them potentially useful in empirical applications, including the comparison of research units working in different fields.