

# Normalized cross-disciplinary article impact evaluation

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A major shortcoming of classical bibliometric indicators such as the impact factor, eigenfactor or h-index is that they cannot be used to compare entities from different disciplines, due to the differences of citation patterns across disciplines. Here we suggest a cross-disciplinary normalization procedure of a PageRank-like scientometric indicator. In order to perform this normalization, a systematic procedure for identifying scientific domains based on the structural properties of citation networks is needed. In this procedure, the most important technical challenge is the large size of citation networks. This constraint requires using local cluster detection methods that have low computational costs and can be used in a parallelized fashion. Accordingly, we propose a local community detection algorithm to identify the scientific domain an article belongs to. We developed a normalized scientometric indicator based on the local version of the PageRank indicator, which is the PageRank calculated on the sub-graph corresponding to a specific domain. We compared local PageRank distributions in different scientific domains determined by the local community detection algorithm, and this led to the development of a simple PageRank normalization procedure. Our method can be generalized to other scientometric indicators.