



Nm Index: A Percentile-Based Metric Accounting for Author Contribution, Sequence, Influential Self-Citations, Career Stage, and Field Norms for Assessing Global Scholarly Impact

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Even though author position is taken into account by some scores, they ignore actual contributions, particularly for middle authors or for alphabetical ordering. Furthermore, position-based scores frequently contain over-rewards and redundancies, like the single-author factor being repeated across sub-scores. Citations differ by domain and year of publication as well, but the existing scores do not account for multi-domain involvement or outlier effects, such as a few papers with a lot of citations or a few with very few. Likewise, h, g, Hf, and Hm indices vary according to article domains and career stage, which disadvantages early-career academics in sectors with few citations. Lastly, while Hm and Hf assume equal author contributions, the m-index penalizes seniors. To solve these inadequacies, this work introduces the Nilmantha (Nm) index, a novel percentile-based metric designed to address these limitations through comprehensive normalization and weighting strategies that produce a percentile score showing academic significance directly comparable internationally. Alphabetical/Random (A/R), Relative Contribution (RC) with multiple/single First Authors (FAs) or Last Authors (LAs), and Explicit Contribution (EC) with multiple/single FAs/LAs are considered. In particular, it employs a harmonic model for RC, uniform weights for A/R, proportionate uniform weights for multiple FAs/LAs per RC/EC, and AHP-driven CRediT or ACI. First, self-influence and overlapping core-author influence are taken into account when adjusting citations for influential self-citations. Second, we calculate the weighted average hf (productive cited output with fractional credit), hm (productive cited output for multi-authorship), and g (highly cited works) indices, all of which are adjusted for career factor (preserving senior academics' collective achievements) and multiple fields. We also calculate the outlier-uncontrolled weighted field- and year-normalized (WFYN) total cites (overall impact), outlier-controlled WFYN citations per paper (average paper impact), and outlier-controlled WFYN citation rate (impact rate). Fictitious author profile use cases are used to validate the model, and the numerical results show that the model captures 36% more impact than traditional C-scores in multi-field contexts, provides 118% more accurate per-paper assessments through contribution weighting, and avoids the over-penalization of senior researchers while appropriately boosting early-career scholars.

Keywords: Author contribution, Author ordering, Self-citation, Career