

Appendix: more details of the proposed solution

$$\begin{aligned}
 &\text{Earned Credit Points:} \\
 &f_o f_i \frac{f_a(\bar{A})}{f_{eb}(N)} \times \text{SCORE} = f_o f_i \times \begin{cases} \frac{2^{|\bar{A}|}}{1 + 2^{N-5}} \times \bar{S} \times \begin{cases} 10, & \text{for contributed review.} \\ 20, & \text{for invited review.} \\ 20/5, & \text{for inviting moderator.} \end{cases} \\ \frac{2^{|\bar{A}|}}{\sqrt{N}} \times \bar{S}, & \text{for informal comment.} \\ \frac{2^{|\bar{A}|}}{\sqrt{N}} \times (3 - 2|A - \bar{A}|), & \text{for rating manuscript.} \\ \frac{2^{|\bar{A}|}}{\sqrt{N}} \times (3 - 2|S - \bar{S}|) \times 2^{\bar{S}-4}, & \text{for rating review/comment.} \end{cases}
 \end{aligned} \tag{2}$$

All numeric details of the proposed solution may be adjusted for different scientific fields. Additional factors may be considered. The openness factor $f_o = 2$ doubles earned points for submitters who disclose their identities. The inflation factor f_i could be applied over time or to compensate for different fields. The attention factor f_a reduces attention to low-quality and harmful works while increasing attention to higher-quality papers.

The credit points required for submitting a preprint, proposal, or synthetic achievement are not spent, but represent an accumulated credit level needed for submission. For example, a member with 100 credit points can submit up to 10 preprints, two proposals, and one synthetic achievement. The standards for rating reviews/comments (S) are completely different from those for preprints (A) as we only consider if the review or comment is relevant and useful for the rating S . The rating score ($3 - 2|A - \bar{A}|$ or $3 - 2|S - \bar{S}|$), ranging from -9 to 3, is designed to deter abusive activities as it tends to reduce credit if not carefully done. Only reviewers and above can rate to prevent abuse and immature activities. We may consider closing ratings and comments when N reaches 1024. Both rating and review submissions require a role in the appropriate subfield and no conflict of interest, which should exclude personal/family/business relations, advisees/advisors, close collaborators, and colleagues in the same institution, as typically required by NSF.

Not only preprints and its revisions, but also review and comment items receive citable DOIs. Each revision of a preprint submission should be attached with a change log by the submitter. Major revisions can reset the rating. It is possible to consider a separate high-risk category for preprints if variance of its ratings is too large (e.g., $\sigma > 1$).

Reviewership and moderatorship are subfield dependent. Moderators can assume more responsibilities like closing comment, review, and rating for a preprint if too much activity is deemed unbeneficial, or regulating other harmful behaviors such as gaming the credit system. Appeals for all issues will be decided by a dedicated committee of board members.

Achievement levels for individual researchers and their works are listed in Table 2. More achievement levels could be added such as L2.4, L2.5, L3.1, L3.2, etc. In practice, lower level achievements below A_{+2} do not need to be reviewed.