

REPORT ON JSTAT_016P_0522

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Title: A rewiring mechanism to improve synchronization in Kuramoto networks

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Referee report

The authors have addressed most of my concerns, but I still think there are minor points to be addressed.

Responding to the response to comment 1: As far as I understand, if an objective function (e.g. the SAF) is used to provide criteria to accept/reject the rewiring during an optimization procedure, then at least the method in [19] attempts to optimize the objective function. Having said that, I partially understand the explanations given by the authors to Comment 1, but I think some issues are misleading and should be discussed in more detail.

In particular, the proposed method is shown to overcome the result of [19] in the low coupling regime while fails to improve it in the high coupling regime. I think that one reason behind this is that the current method improves the sampling of potential links, but it only relies on the structure of the network (via the largest eigenvalue) while assuming a random (or unknown) allocation of frequencies, while the method in [19] exploits both the structure of the network and the frequencies of the nodes. Furthermore, if the vector w is aligned with the eigenvector associated with the largest eigenvalue, then having a larger eigenvalue improves synchronization. However, if w is not aligned with any eigenvector in particular, then the increase of the largest eigenvalue may lead to a decrease of synchronization, as probably occurs in the experiments here. I think the authors should comment on this point and clarify their analysis under the light of reference [20] from Skardal et al.

Please label equations from (11) to (12) and

Please, add point to et al.

Using largest instead of biggest eigenvalue may improve readability following previous literature on the topic.

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