

# Review of: "Determining Affinity of Social Network using Graph Semirings"

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**Potential competing interests:** No potential competing interests to declare.

The authors present an algorithm that allows decomposing a given graph into categories, which result in induced subgraphs of the initial graph. From this decomposition, they introduce a measure of stability of the paths linking the obtained subgraphs. This measure, among others, has application in recommender systems which could be relevant in any social network, in particular in new connections made on Facebook. I believe that this work is well written and can be useful in social network analysis, furthermore, it can be used in any type of graphs where nodes can be partitioned by groups. Therefore, I consider that, once my indications given below are taken into account, the paper will be accepted for publication in your Journal.

1. Reference 6 is in a different format than the others. In addition, some have fields such as DOI and others do not, they must be consistent with the way they present the references.
2. In the introduction please say what kind of stability you are referring to, since there are several ways to measure it in a network.
3. I do not see the reason for using Semirings in the title of the paper, I do not see any relation with the content.
4. The introduction lacks to go deeper into the state of the art of the problem, which is also reflected in the number of references used; and take into account that something key for the reader is to go deeper into what are the contributions of the authors in the paper they present.
5. In the captions of the figures the authors should express what they are representing.
6. Figures should be referenced in the document, which they are not.
7. There is something that confuses me in the notation, they introduce a graph measure denoted by  $\beta_i$ , and then use it as the weight of the edges of the graphs resulting from the components obtained by the categories they consider. They should clarify this, as it is relevant to the edge stability analysis they present.
8. Authors only use the case of Facebook to represent the categories of the toy graph, but the problem could arise in a general way in any heterogeneous network in which different types of nodes are introduced. In particular, it could be mentioned that their framework can be used in a network like Facebook or any other. This could be used in the explanation of the geometric meaning of the measure they introduce, but showing the actual application of their metric, since it is not very clear how they could use it.

