Degree-constrained minimum spanning hierarchies in graphs

proposed for **Algorithms /MDPI** by Miklos Molnar

Response to Reviewer 4 Comments

1. Summary

Thank you very much for taking the time to review this manuscript. Please find the detailed responses below and the corresponding revisions in the re-submitted proposition.

2. Questions for General Evaluation	**Reviewer's Evaluation**	**Response and Revisions**
Does the introduction provide sufficient background and include all relevant references?	Yes	
Are all the cited references relevant to the research?		
Is the research design appropriate?	Yes	
Are the methods adequately described?	Yes	
Are the results clearly presented?	Yes	
Are the conclusions supported by the results?	Yes	

3. Point-by-point response to Comments and Suggestions for Authors

Comments1

l.20

The word "structure" is used here in an informal way, but later (l.118) it appears as a technical term. At line 8 (i.e. in the Abstract) it is specified as a hierarchy, but Property 1 (l.120-121) seems to set a difference between the two concepts. I think that the word "structure" should either 1) be formally defined before Definition 3 and Property 1, or 2) avoided within formal statements as these.

Response1

Thank you very much for this comment. It is not easy to define clearly the hierarchy concept. It is not a sub-graph. For this reason, I used the term graph-related structure. It is not the only one in this category; there are walks, non-elementary cycles, grides, etc., which are graph related structures that can defined using a homomorphic mapping.

I propose the term graph-related structure in the abstract and replaced the term ''structure'' by ''solution'' later in the paper.

Comments2

p.5, footnote 1

Actually, it should rather be said that remotion makes the number of connected components increase. I understand that there is an implicit condition of connectedness of G, but this should be explicitly said at the beginning of the formal part. My suggestion: add "connected" at line 54, when introducing G.

Response2

Thank you for this indication. At the beginning of Section 4, you can find:
"Remember, we suppose a connected graph and $Vm \subseteq V$ indicates the subset of nodes with degree bound m. "
To be more precise, I changed the footnote:
"Removing a separator makes a connected graph disconnected"

Comments3

l.178

These paths should not contain either a or b. I believe that the condition on V_1 implies the existence of shortest paths not containing them, but it should be proved. Why not drop the condition of being shortest? It is immediate that paths not containing a and b exist, if no constraint on their length is forced.

Response3

Thank you for this proposition.
I think the proof is true and simple. The metrical closure can always be built,
Since the set of nodes should be covered, a walk covering the node set is a Hamiltonian path between A and B in the metrical closure.
I prefer the original proof.

Comments4

l.458-459

The form of this statement is not - in my opinion - one of a theorem, but rather of a remark. I suggest either to reformulate it in a more formal way or to label it as Remark.

Response4

Thank you very much for your comment. I think, it is important to know that there is no approximation compared to an MSTSL when $|V1| > 2$ effective for all cases.
Are there approximations in some cases? Further investigations are needed. To simplify, in this study, I labeled this statement as Remark.

Comments5

Finally, I have some language-related suggestions, although I am not of English mother-language (see the specific window).

Response5

Thank you for the suggestions. Following these suggestions, I revised the paper.