A NUMERICAL EXAMPLE ON THE IDEA OF DECLUSTERING

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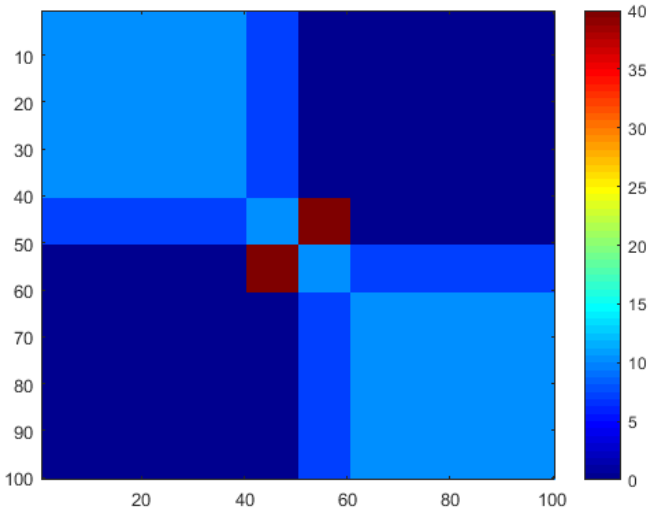
Abstract. A numerical example is shown to conceptualize the idea of declustering.

1. Introduction

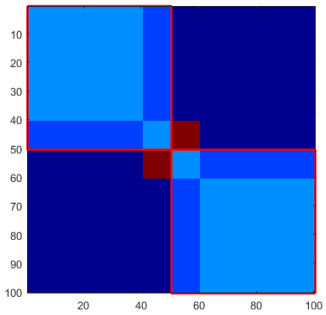
When a hierarchical clustering algorithm is used to cluster a graph, it sometimes happens that the subclusters of two previously separated clusters could be very close to each other. Here we show one example of such situation in graphs.

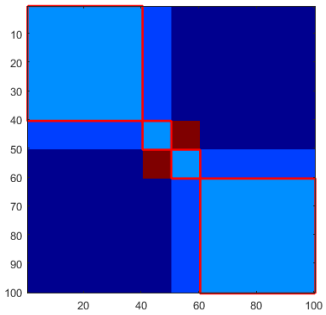
2. A numerical example

Let G be a weighted graph with the following adjacency matrix.

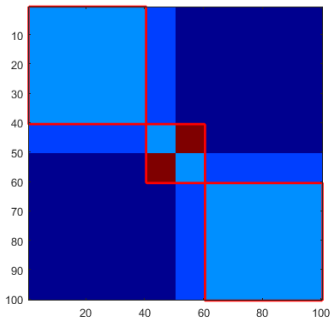


Using the iterative Fiedler method we can break this into two (and three) and four clusters, as shown below. The method first breaks the graph right in the middle: first 50 vertices are one cluster, and the rest are another cluster. Then one of the two clusters is broken down at 40–10 ratio. And finally another cluster is broken down at 10–40 ratio.

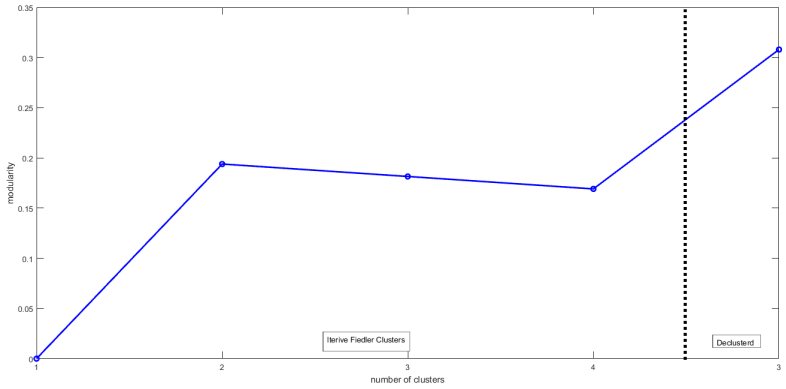




The intuitive to consider is that the middle two clusters, both of size 10 were separated from each other because of the two big clusters of size 50 in the first step. But now it seems like they can be glued back together, and they'll from a strong cluster. Let's see what will happen if we do this:



Here are the modularities of each clustering:



3. Conclusion

The idea of declustering is essential in any clustering algorithm, and it needs to be implemented accordingly.

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