EurPhysJ2010Rosvall
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Question 1

10 out of 10 points

In order to be able to obtain a solution including all nodes of the weighted network and to be independent from the starting point of the random walker, the procedure has incorporated a teleportation parameter at a particular rate r.
In contrast to the application of the teleportation parameter in the calculation of the page rank, the parameter in the map equation is made relative to the number of edges associated to the node.

When calculating the probability to be a particular node a in the map equation, the teleportation parameter can be relative to the proportion of the weights of edges arriving at this node or leaving the node. Which of these options is used in the map equation?

Selected Answer: ✓ Departing from the node

Answers: Arriving at the node

✓ Departing from the node

Question 2

Needs Grading

The teleportation is unrecorded. This means that a step that is the result of a teleportation is not recorded in the random walk and thus not influences the calculation of the average length of the code describing the random walk. Explain the effect the teleportation has on the creation of the random walks taking into account your answer on the previous question

Selected Answer: By not recording the teleportation steps of the random walker, we can further reduce the effect of teleportation with dramatic effects on clustering

Reference: https://arxiv.org/pdf/1112.5252.pdf

Correct Answer: ✓ The probability of the target node is relative to the total number of links departing this node. This make the random walker more robust and independent from the location where it starts.

Response Feedback: [None Given]

Question 3

0 out of 10 points

Is this statement true?

'A clustering of a large network based on the map equation suffers from the resolution limit.'

Selected Answer: ✗False

Answers: ✓True

False

Question 4

Explain you answer to the previous question. Compare the presence/absence of the resolution limit with a partitioning using a modularity based approach, using a hierarchical approach and the effect on small networks

Selected Answer: Modularity based approaches suffer with resolution limit, since its presence unable the detection of small communities.

In hierarchical approaches overcome the resolution limit issues by introducing a multiplicative factor, called the resolution.

Reference: https://arxiv.org/pdf/1806.01664.pdf

Correct Answer: ✓ The resolution limit of the flow-based map-equation is magnitudes smaller than that of traditional modularity based clustering approaches. But the issue is not eliminated. Large networks will be affected.

Response Feedback: [None Given]

LeidenAlgorithm

Question 1

Needs Grad

What is your opinion about the resolution limit for the Leiden algorithm?

Correct Answer: Based on the literature of Fortunato and Good and colleagues we can conclude that the resolution limit will be present in any partitioning algorithm.

✓ The Leiden algorithm does not particularly deal with the resolution limit but attempts to avoid to obtained un- or loosely connected submodules in its final solution as can be observed in other approaches.

Question 2

Needs Grad

Figure 4. Indicates that the iterations are important for the improvements of the Leiden algorithm. The share of badly connected communities decreases with each iteration. Provide an explanation why this algorithm has a higher share of badly connected communities than the Louvain method in the first iteration.

Correct Answer: ✓ As both the Louvain method and the Leiden method use the same quality function in the first iteration, the differences has to brought back the moving of the nodes along the edges. In the Louvian method, nodes keep moving until no further improvement is obtained while in the Leiden method, nodes become only active again after one of its neighbors is moved from one partition to another.