HW#4 —— Graph Clustering Algorithms

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1 Markov Clustering

Markov clustering makes use of stochastic flows in a graph. The underlying idea is that a random walk on a dense cluster is likely to stay on the vertices of this cluster before jumping to other cluster. This property is made use by simulating a stochastic flow on the graph such that the flow be promoted wherever the current is strong and downweighted otherwise. This can thus be formulated as a Markcov graph. The flows are modelled by calculating successive powers of the matrix.

2 Restricted Neighborhood Search

RNS clustering tries to minimises a cost function that captures the weight of inter and intra cluster edges. With a random initial value, RNSC iteratively assigns a node to other cluster if that leads to a local minima. Termination can be defined based on number of iterations or convergence of the cost function.

3 Molecular Complex Detection

Molecular complex detection assigns a weight to each vertex that is proportional to the number of neighbors. Starting from the heaviest vertex it iteratively moves out assigning each vertex to the cluster if it is above a certain threshold.

4 Comparison