НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
УНИВЕРСИТЕТ

Social Network Analysis

Network Science

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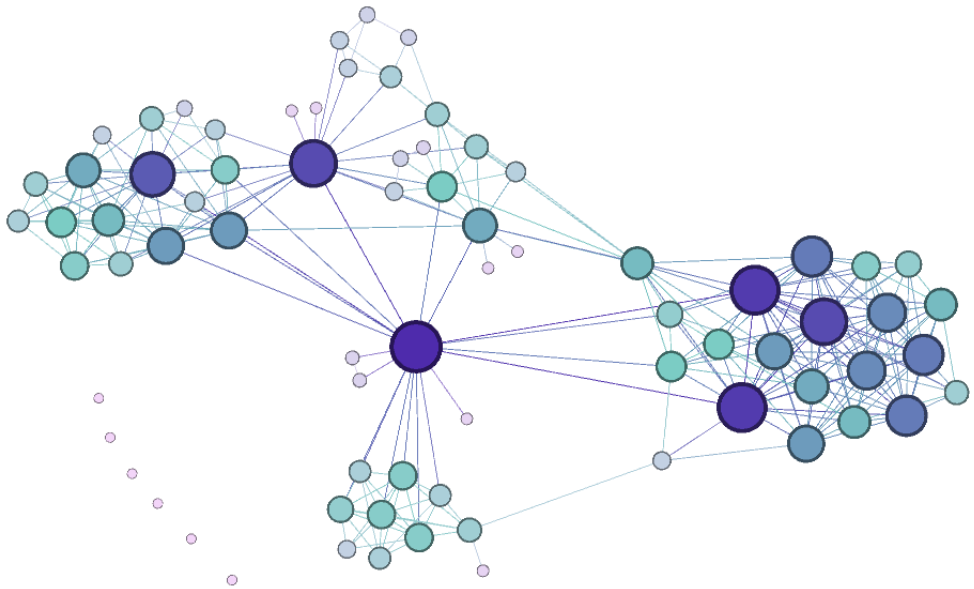
Network summary

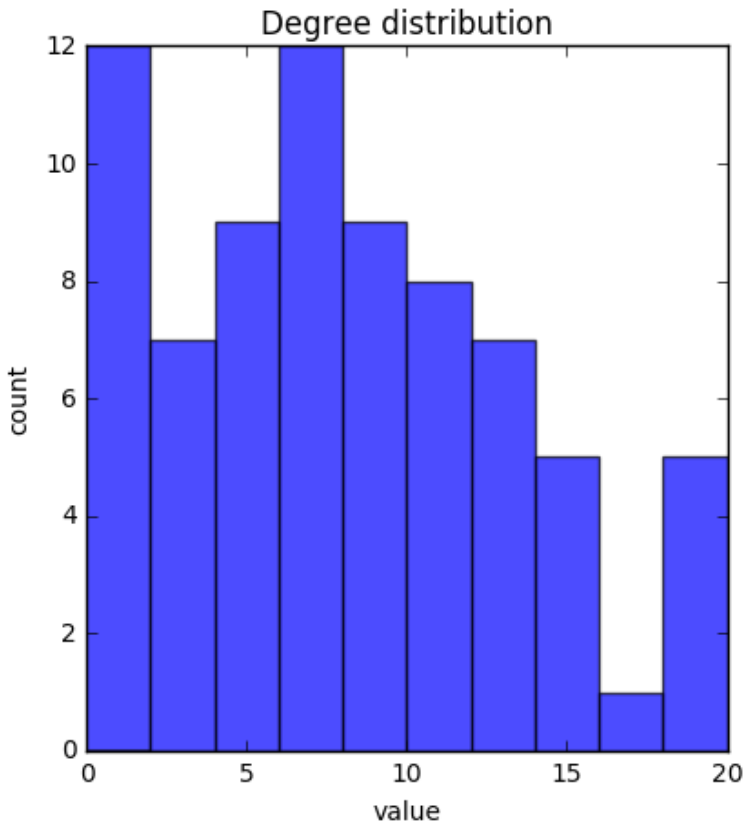
General network characteristics

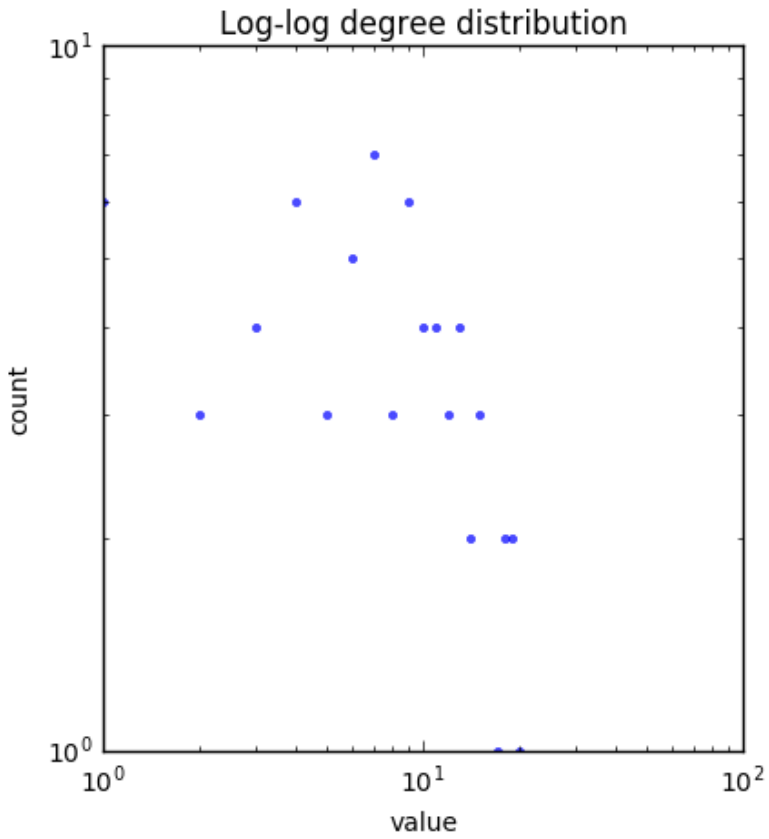
- Number of nodes: 75
- Number of connections (edged): 288
- Node attributes: VK uid, name



Network summary

Degree distribution



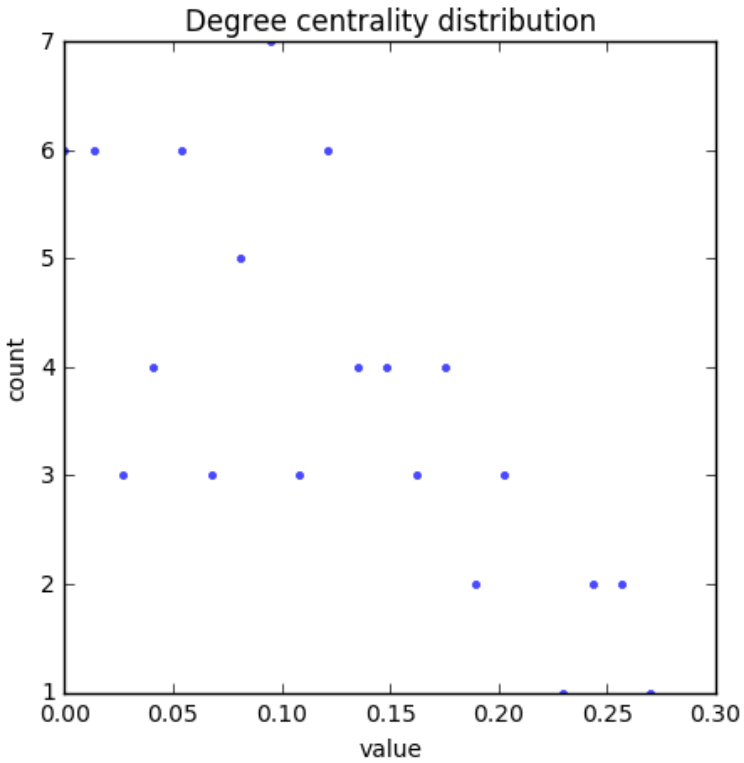


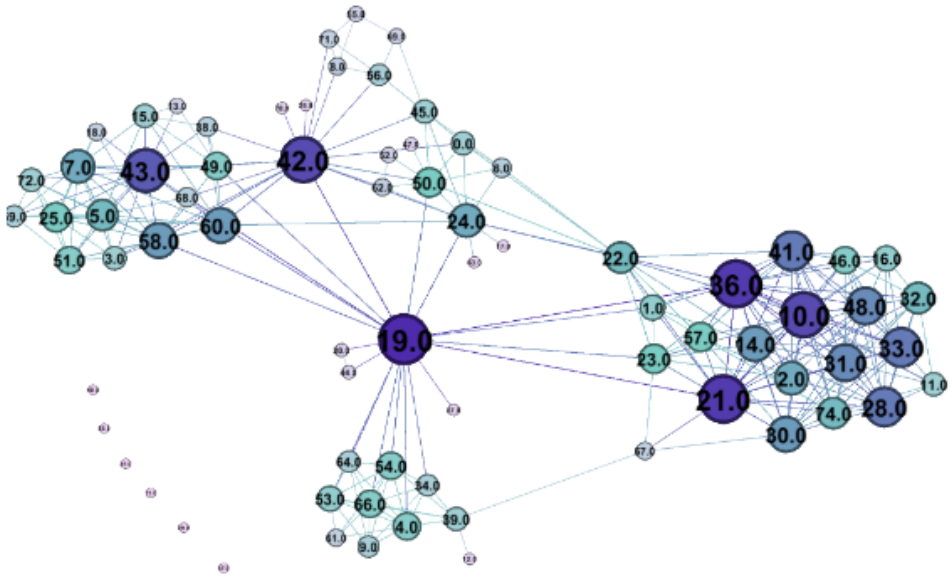
The **diameter** is equal to ***6***.

The **average path length** is equal to ***2.786***.

Structural analysis

Centrality metrics

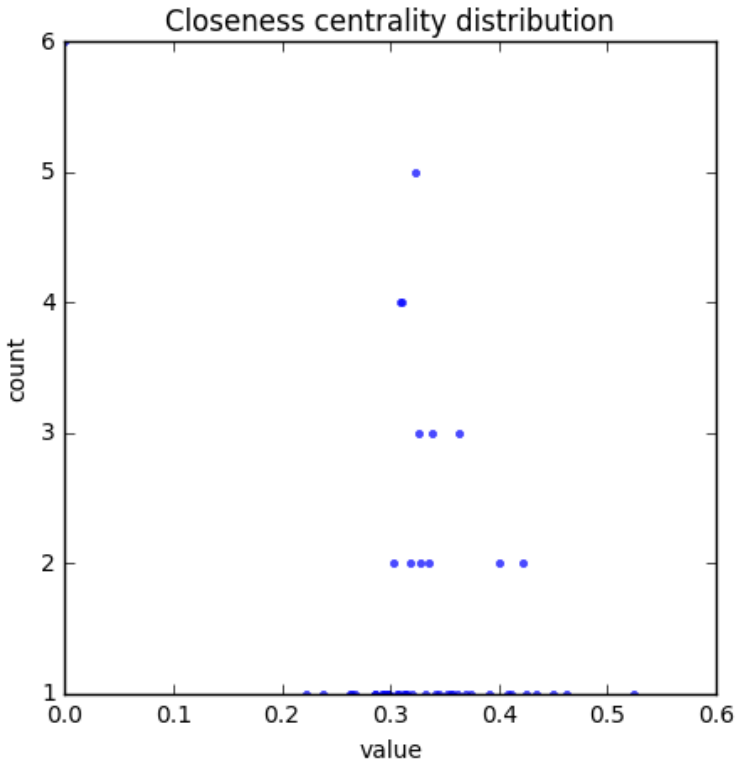


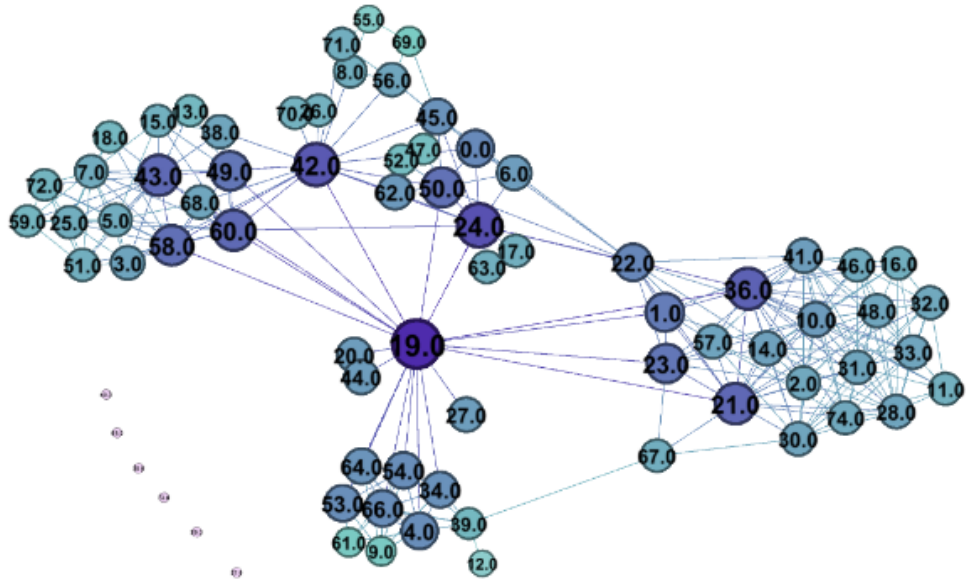


The most evenly distributed metric.

Structural analysis

Centrality metrics

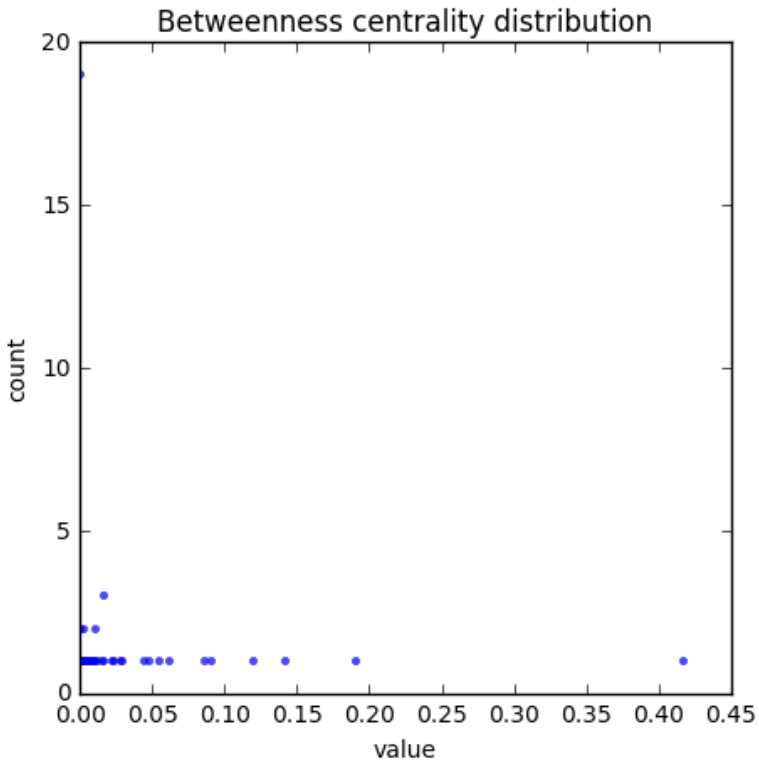


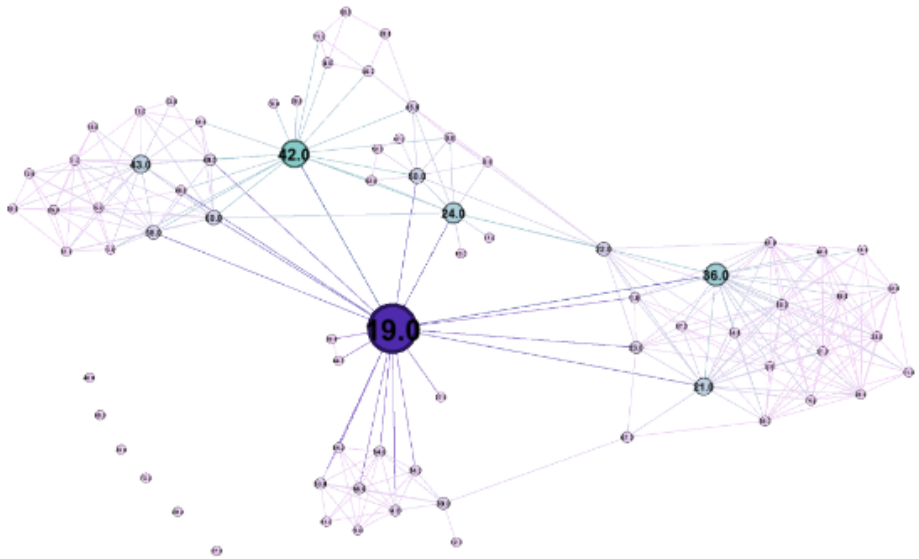


Most of the nodes have similar values of the metric.

Structural analysis

Centrality metrics

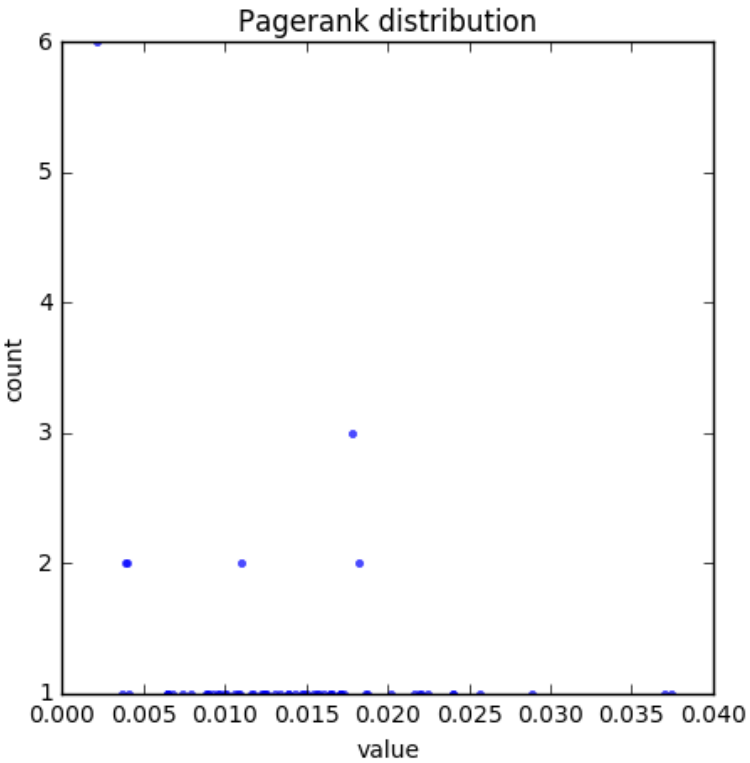


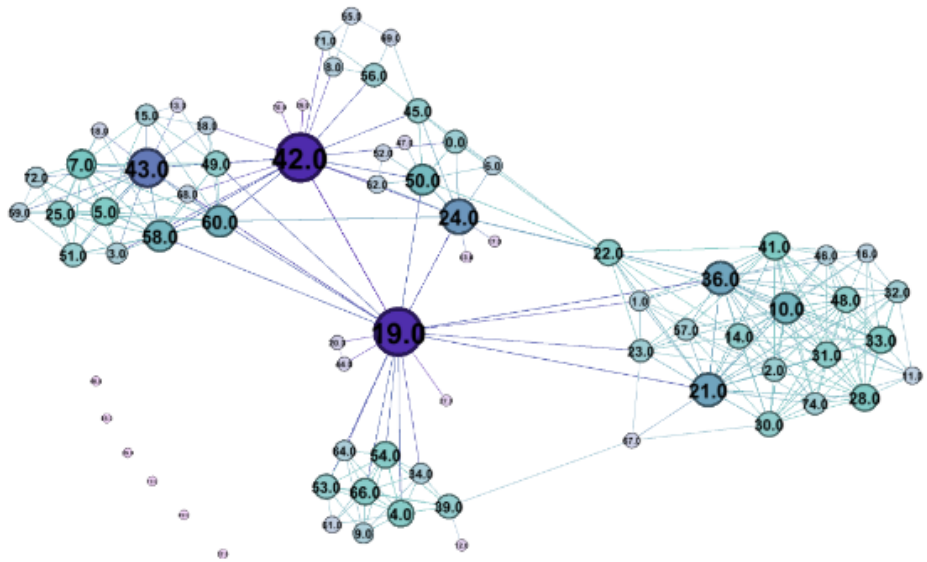


A few nodes have large values of the metric.

Structural analysis

Page Rank algorithm



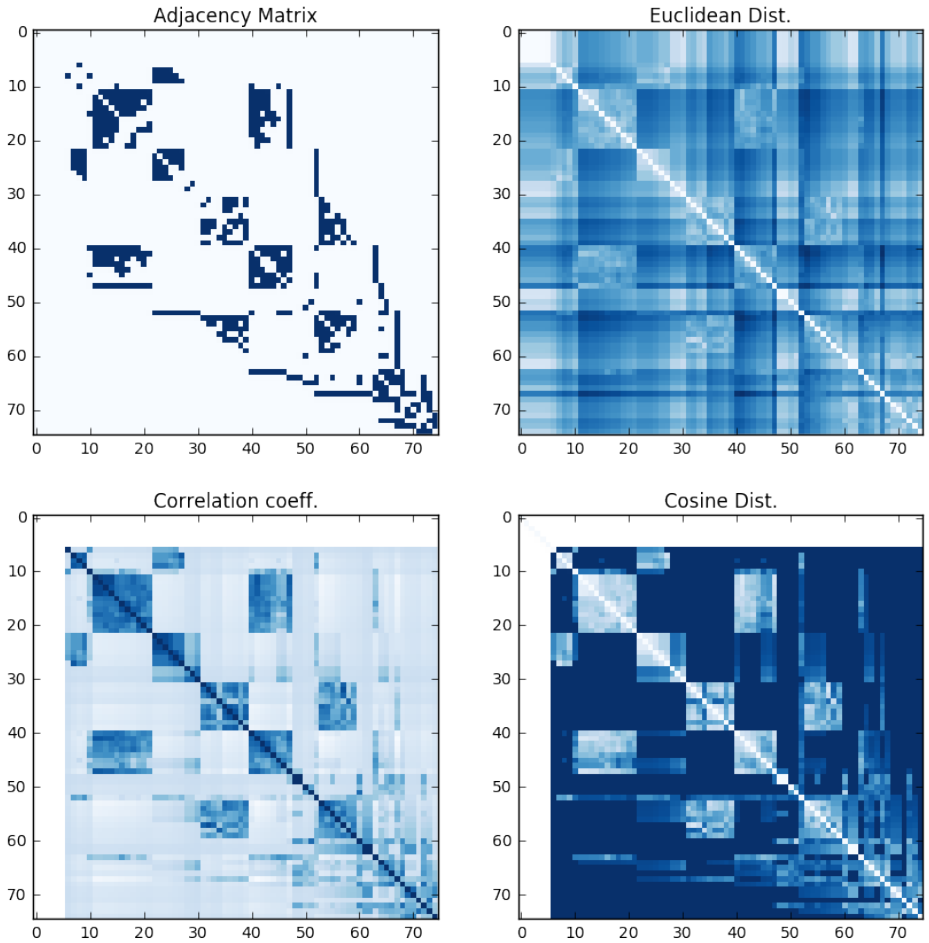


Nodes with largest betweenness centrality got largest values of 'importance' via Page Rank.

In general, result are very similar to degree distribution.

Assortativity coefficient of the network is equal to ***0.101***.

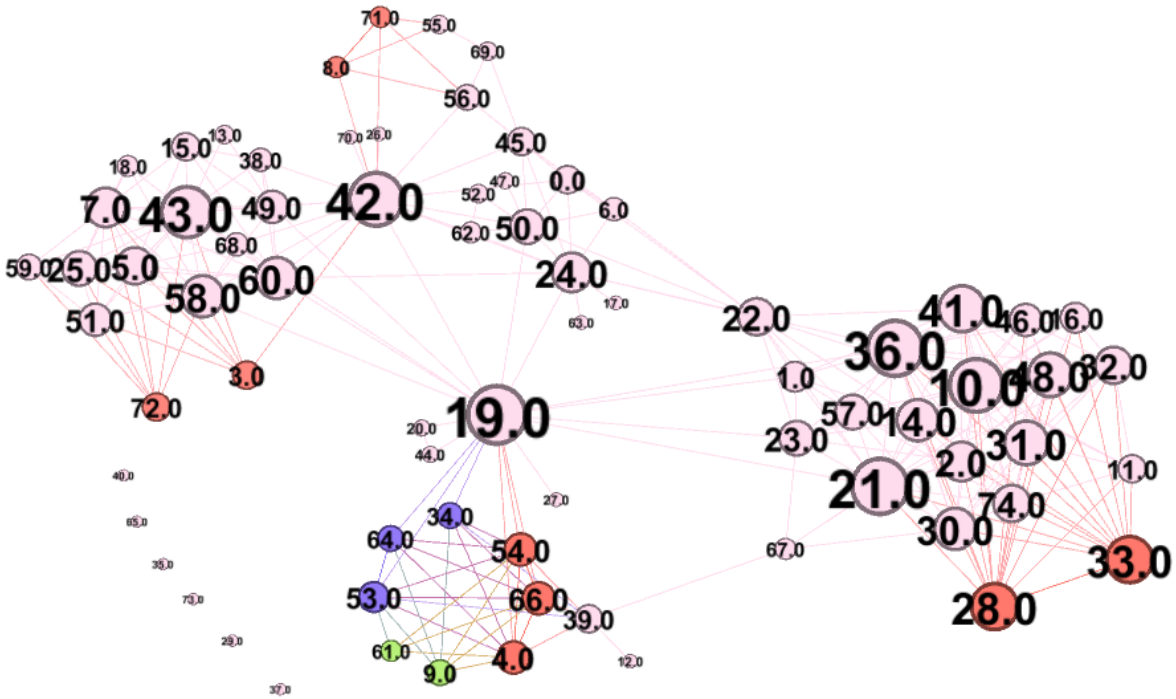
Similarity metrics:



Structural analysis

Assortativity and nodes similarity

The most similar nodes in accordance with Euclidean distance (colored):

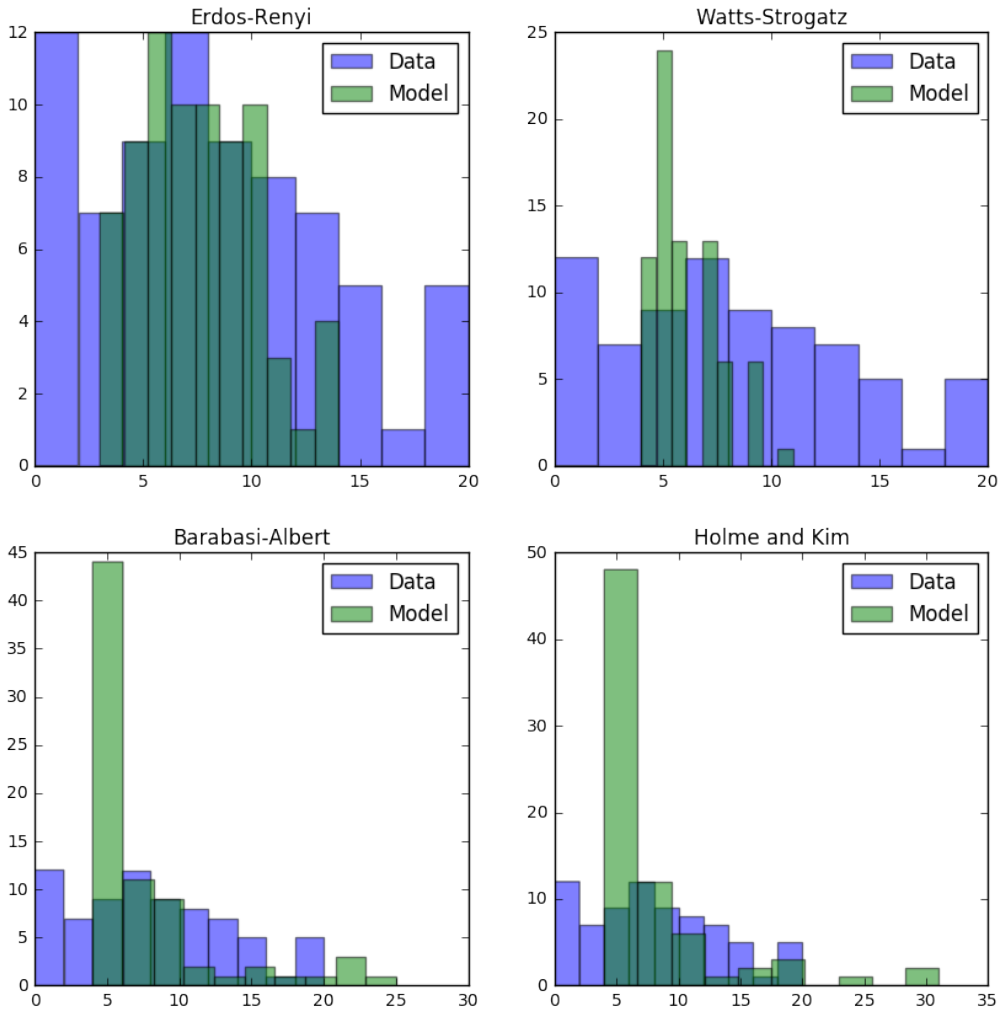


- ***Erdos-Renyi***
- ***Watts-Strogatz***. k = average degree, and $p = 0.6$ (p is the probability of rewiring the node)
- ***Barabasi-Albert***. $m = 4$ (number of edges to form for new nodes)
- ***Holme and Kim*** $p = 0.6$ (probability to form extra-triangle)

With average clustering coefficients:

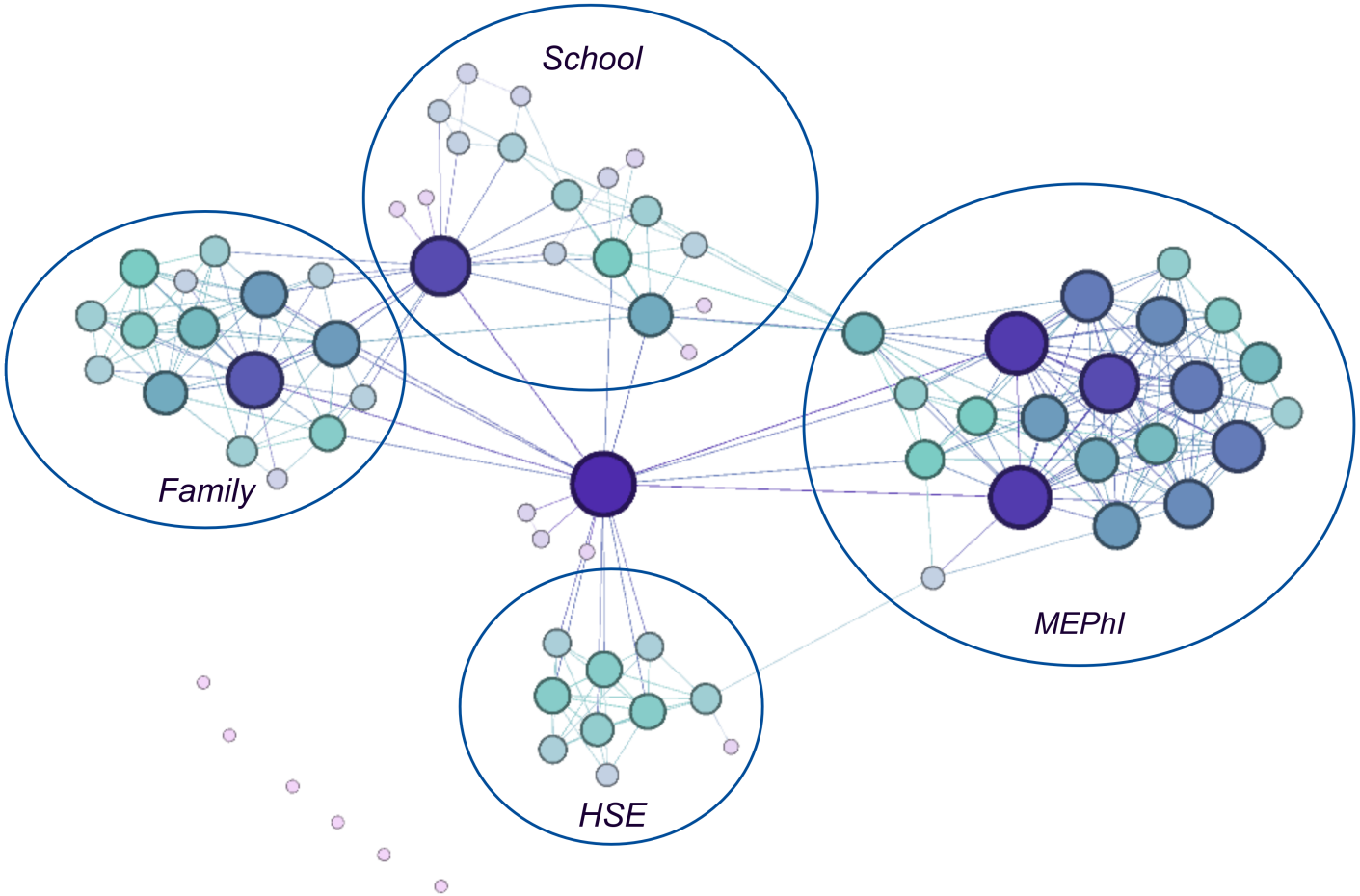
- Data: 0.584
- Erdos-Renyi model: 0.089
- Watts-Strogatz model: 0.099
- Barabasi-Albert model: 0.169
- Holme and Kim model: **0.358**

Degree distributions:

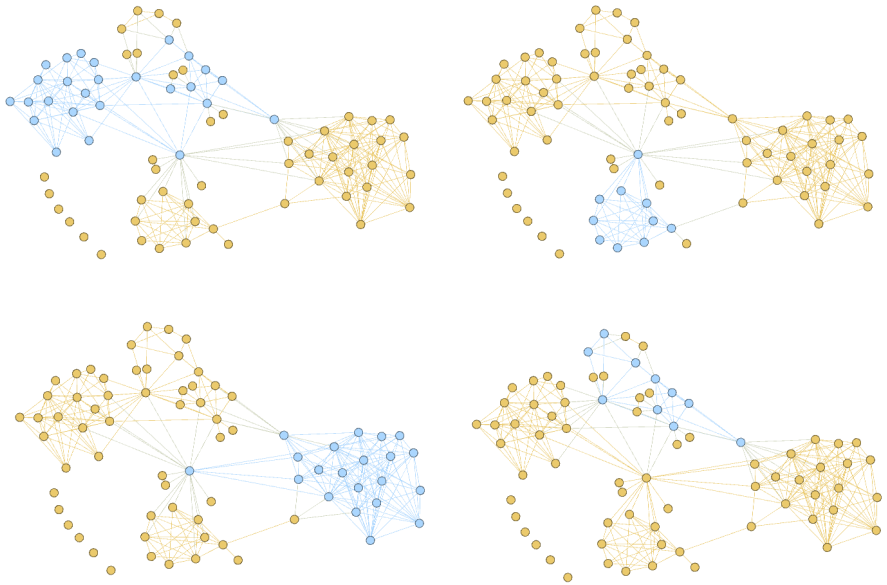


Community Detection

Sketch



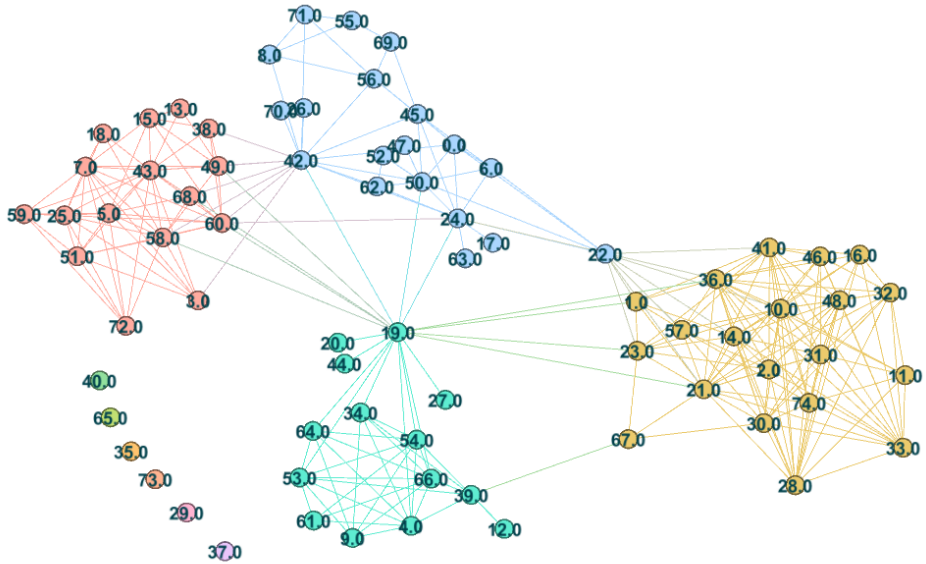
$k = 4$. Clique communities are **blue**



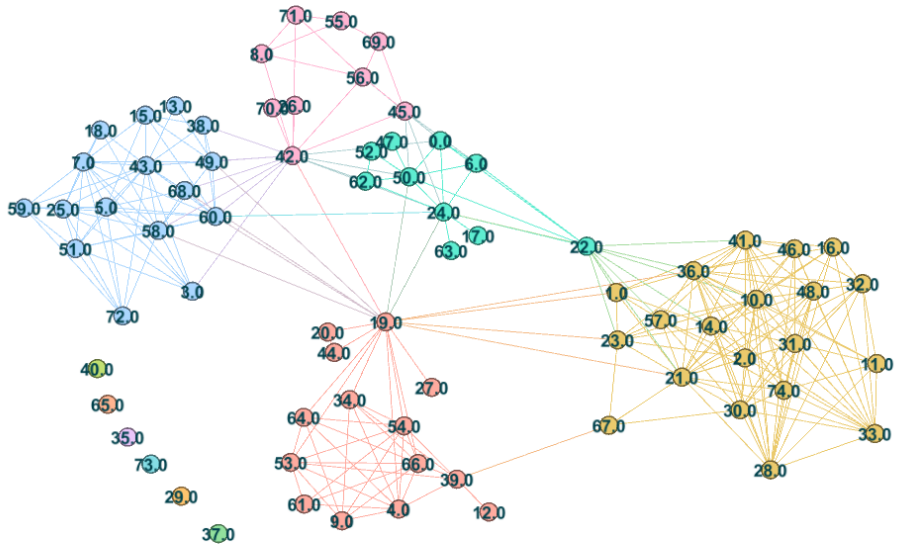
Unforunately, in two of four cases the algorithm failed to find precise communities. And though it managed to find some interesting patterns, the results aren't satisfying.

Community Detection

Louvain algorithm



This partition mostly coincide with my sketch, but some nodes are categorized incorrectly.



The algorithm categorized a few nodes incorrectly, but it did better job in finding communities among my school friends, it almost perfectly distinguished two different groups.

Thank you for your attention!