Social network analysis

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Outline

1. **Network   Summary**
- Node/edge attributes
- Network layout
- Degree distribution, diameter, Clustering Coefficient

2. **Structural Analysis**
- Degree/Closeness/Betweenness centralities
- Comparison of PageRank and other centralities
- Assortative mixing
- Node similarity
- The closest similar random graph

3. **Community detection**
- Clique search

Network Summary

Source: vk.com

Data access: via VK API request

Unweighted undirected graph.

Preprocessing:

-Decoding('1' **:**'male')

Network Summary

Node Attributes:

- First name

- Last name

- Sex
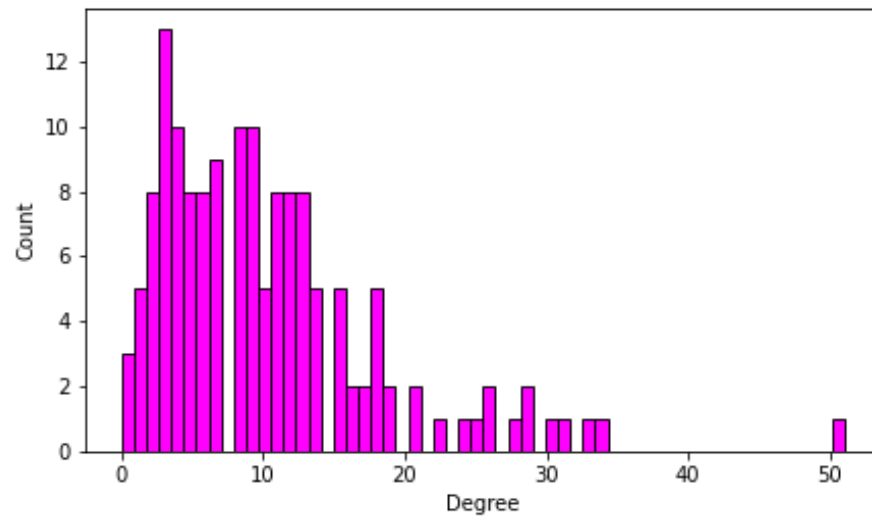
- City

- University

Order: 149 (nodes)

Size: 764 (edges)

Degree distribution
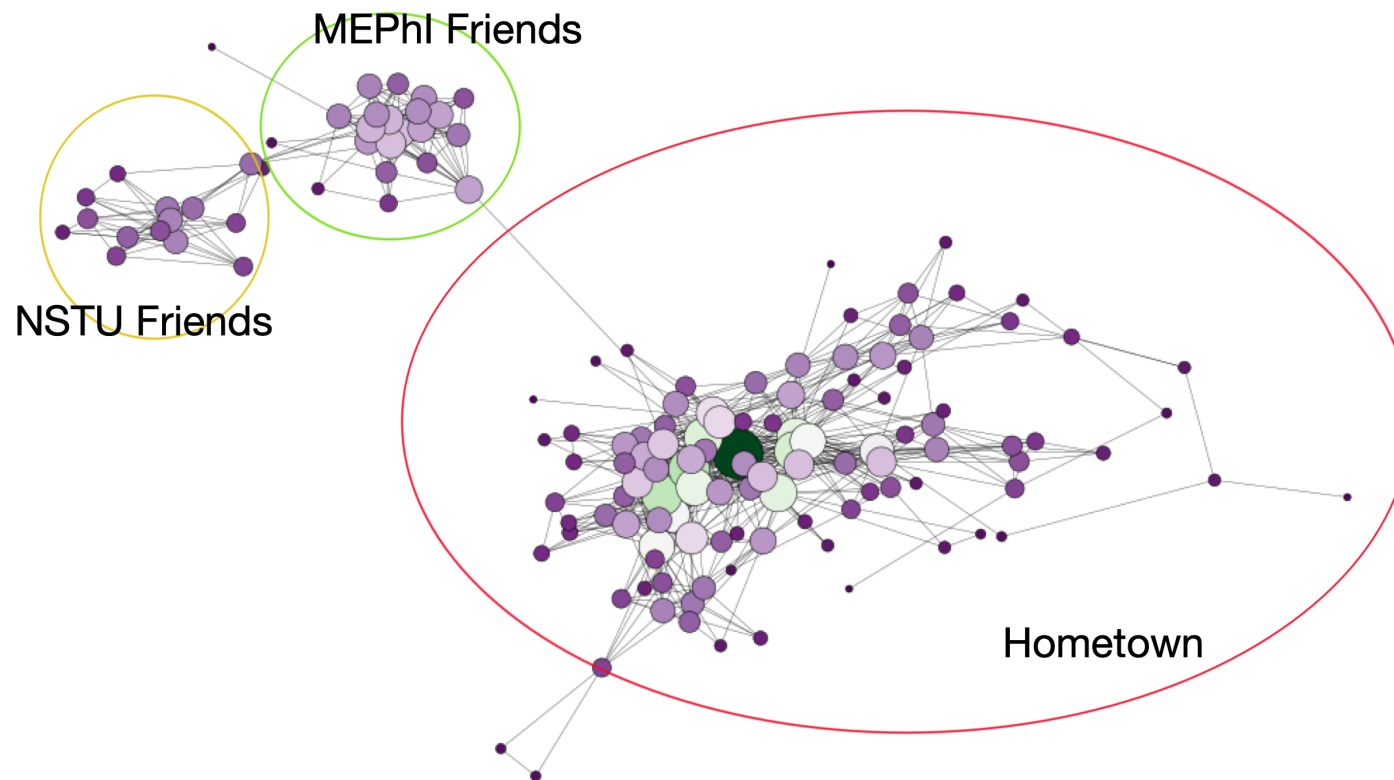
Average clustering coefficient: 0.55

Diameter: 9

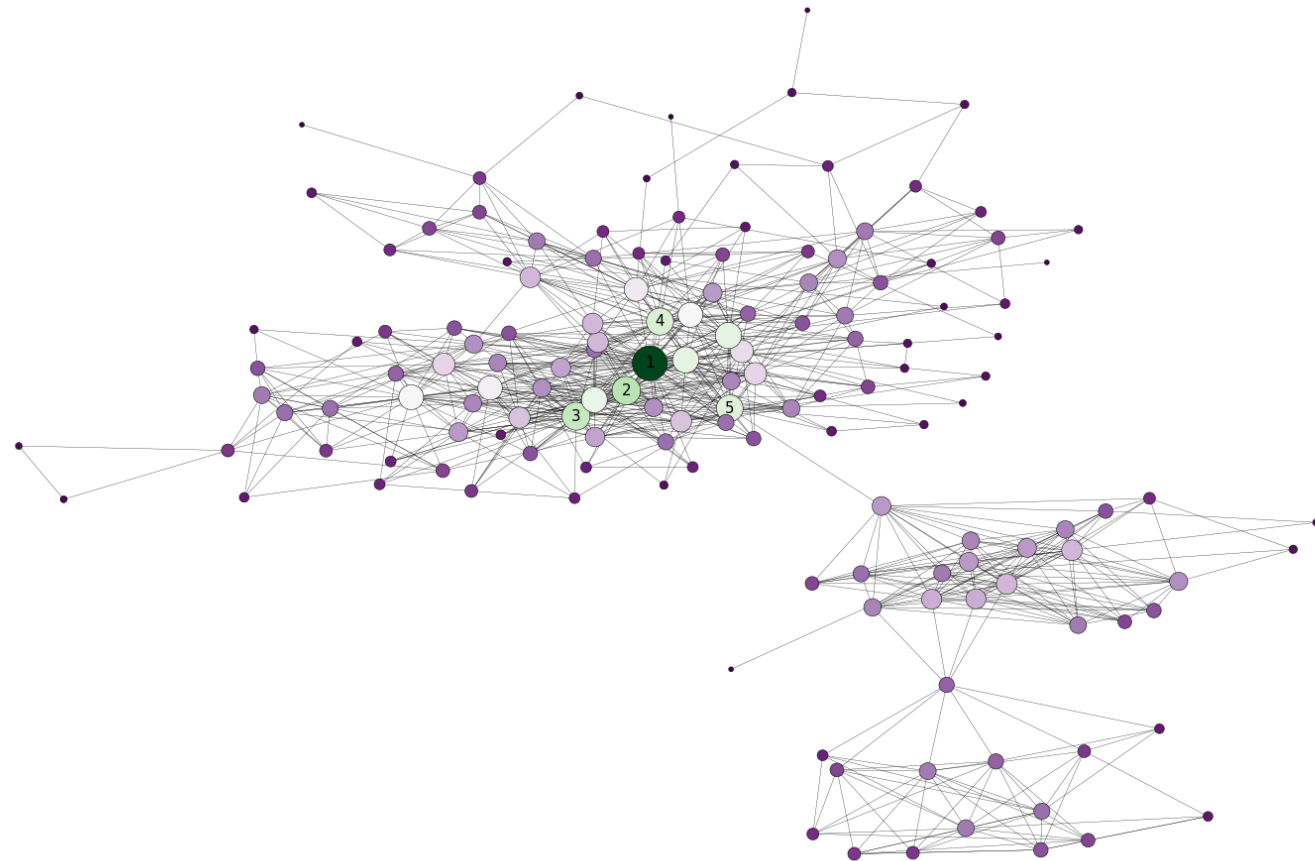**Looks like power law…**

Network Layout

Centralities

Degree centrality

Centralities

Closeness centrality

Closeness top nodes

1	Вазген Аракелян
2	Самвел Гаспарян
3	Sona Vardanian
4	Irina Vardanyan
5	Дима Маштаков
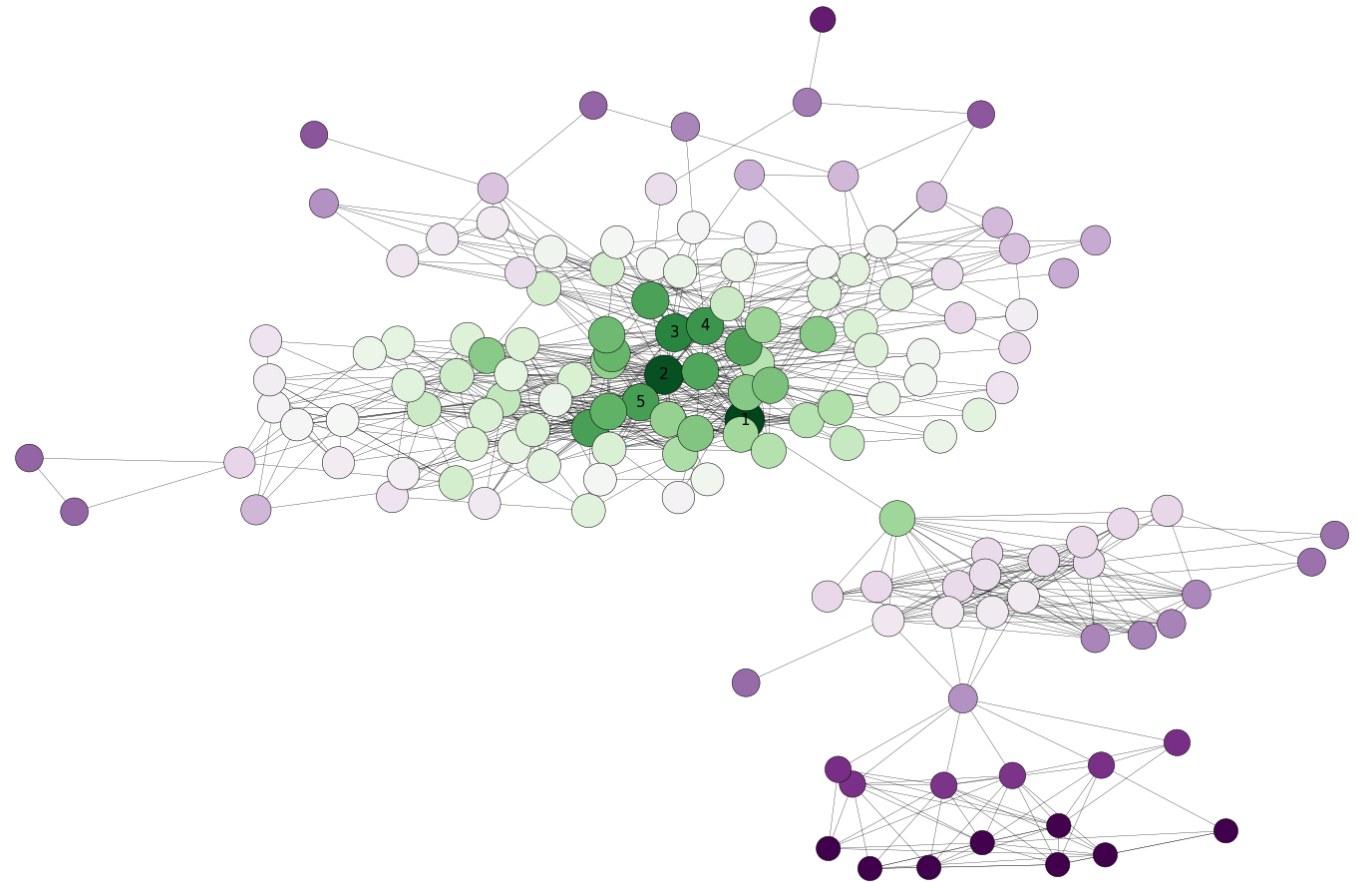
Centralities

Betweenness centrality

Betweenness top nodes

1	Самвел Гаспарян
2	Дима Маштаков
3	Никита Зуров
4	Sona Vardanian
5	Serzh Dzhanazyan
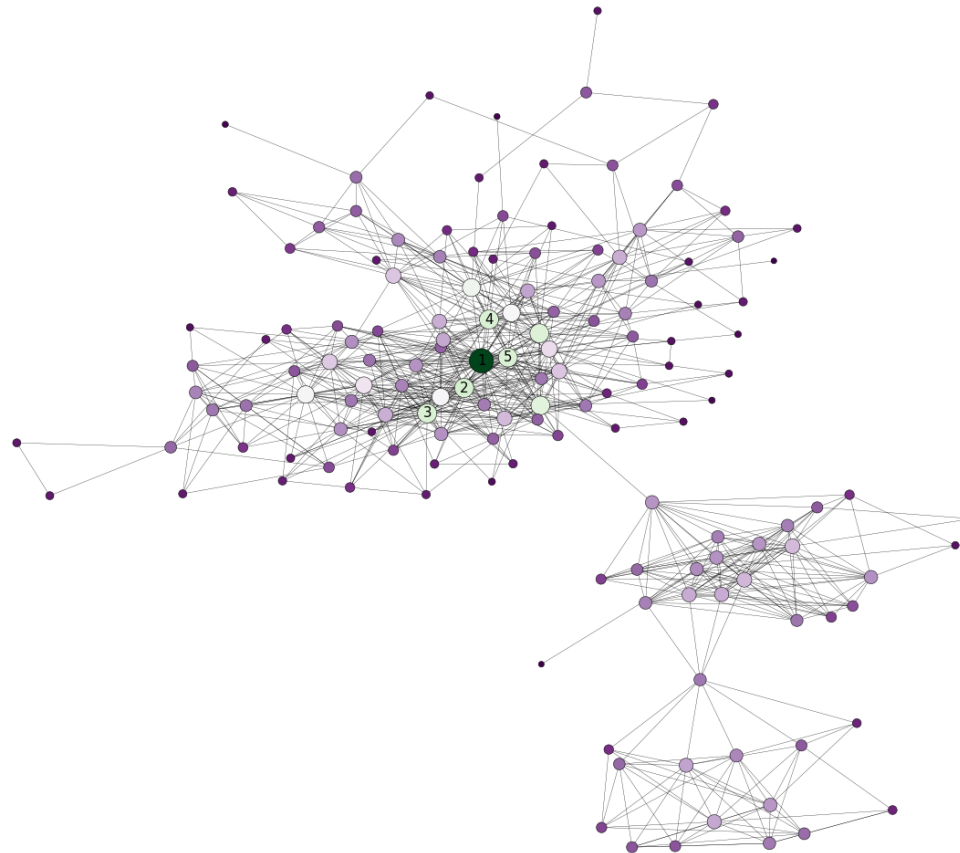
Centralities

Page Rank

	Page Rank top nodes
1	Самвел Гаспарян
2	Дима Маштаков
3	Никита Зуров
4	Sona Vardanian
5	Serzh Dzhanazyan
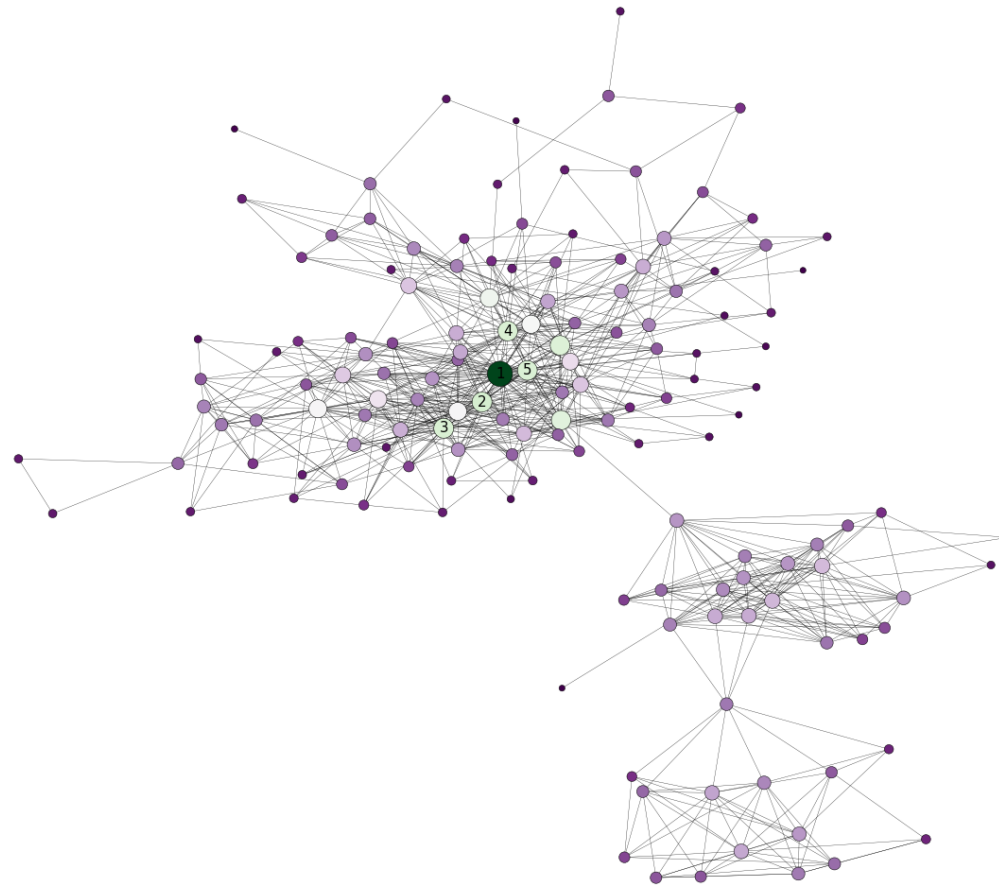
Centralities comparison

	Betweenness top nodes	Degree top nodes	Page Rank top nodes	Closeness top nodes
1	Самвел Гаспарян	Самвел Гаспарян	Самвел Гаспарян	Вазген Аракелян
2	Дима Маштаков	Дима Маштаков	Дима Маштаков	Самвел Гаспарян
3	Никита Зуров	Никита Зуров	Никита Зуров	Sona Vardanian
4	Sona Vardanian	Sona Vardanian	Sona Vardanian	Irina Vardanyan
5	Serzh Dzhanazyan	Вазген Аракелян	Serzh Dzhanazyan	Дима Маштаков

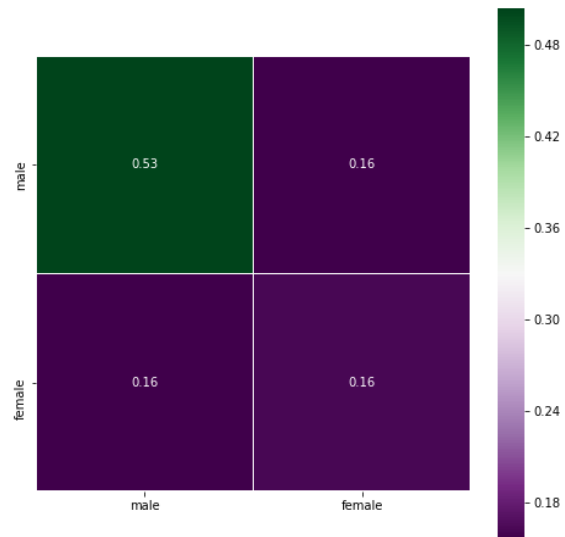## Betweenness and Page Rank look pretty similar
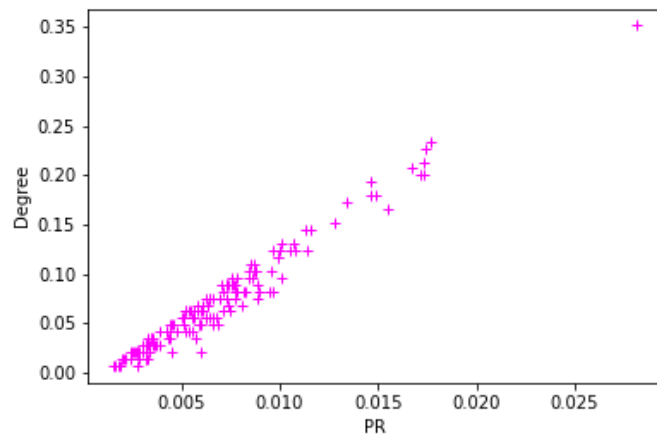
Assortative mixing

Sex

Heatmap shows that male to male connections prevail

Assortative mixing

City

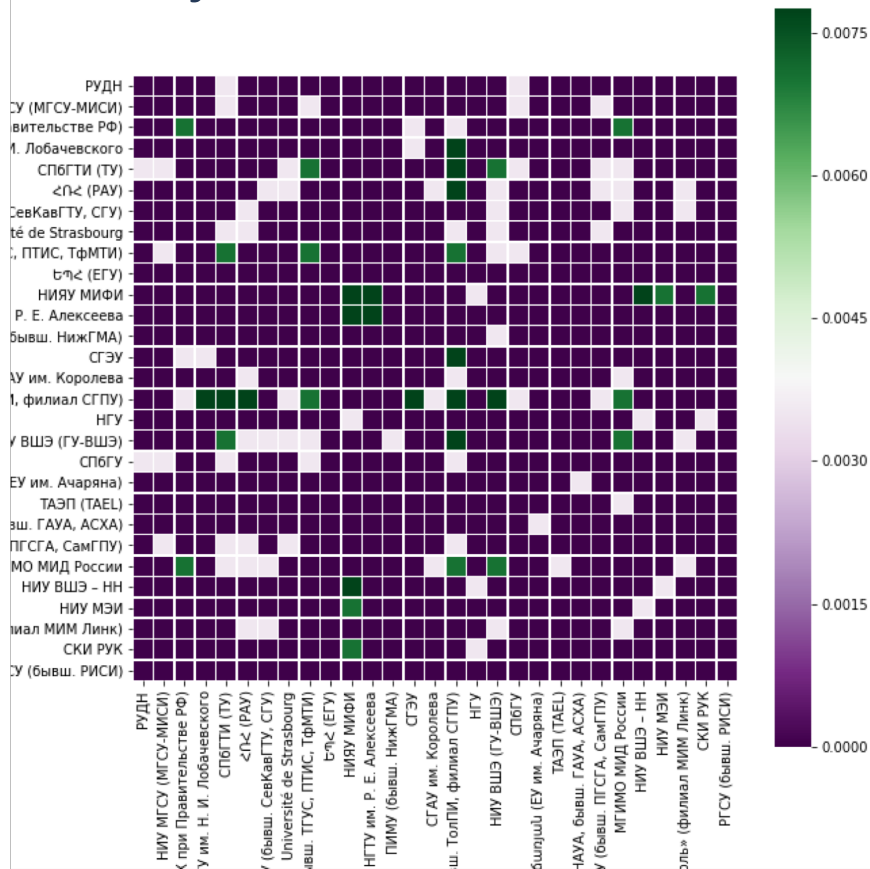
Togliatti is my hometown.

Moscow – city where I live and study.

Network is definitely city - assortative
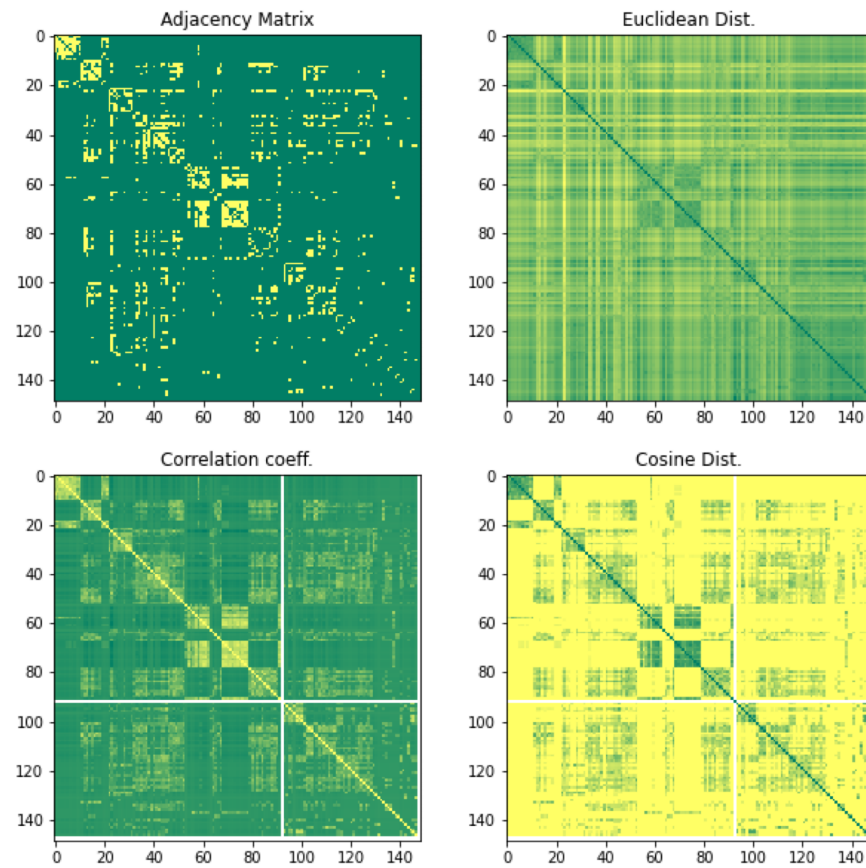
Assortative mixing

University

MEPhi, NSTU – my previous universities.

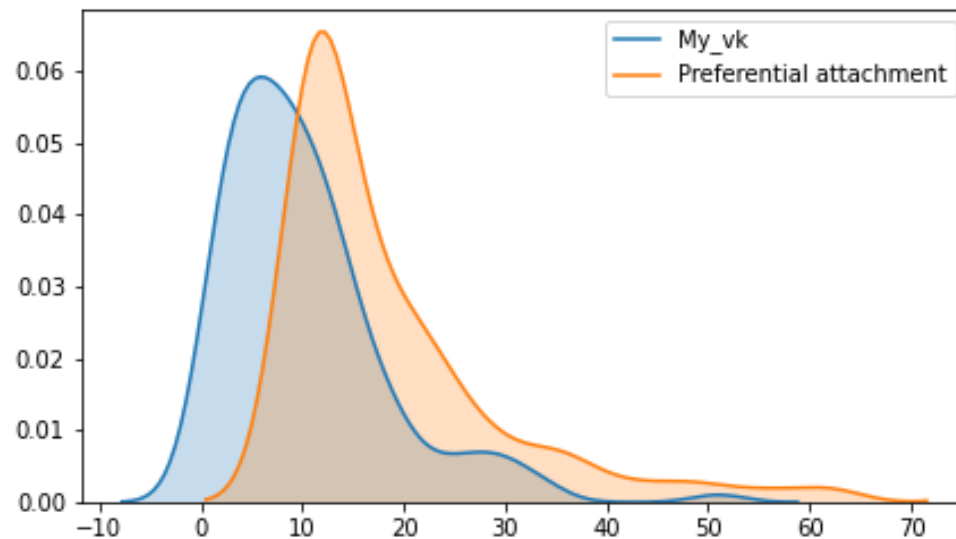Network is university-assortative.

Node equivalence

Random Graph model

**Barabasi-Albert graph may have similar node degree distribution
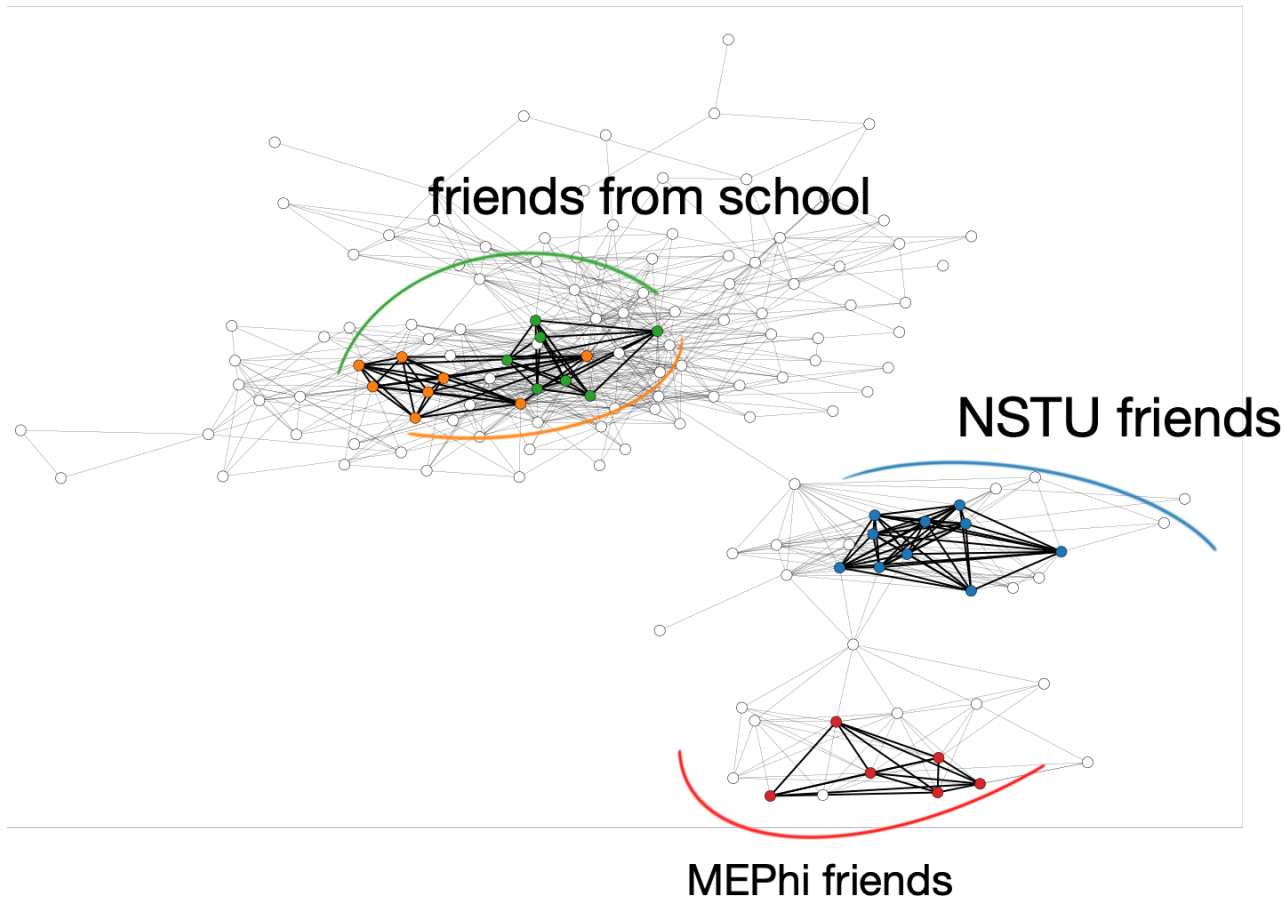but of course the graph would be tougher(better connected)**

	My_network	PA
Diameter	3	9
C	0.55	0.22

K-cliques

friends from school

NSTU friends

MEPhi friends

Thank you for attention!