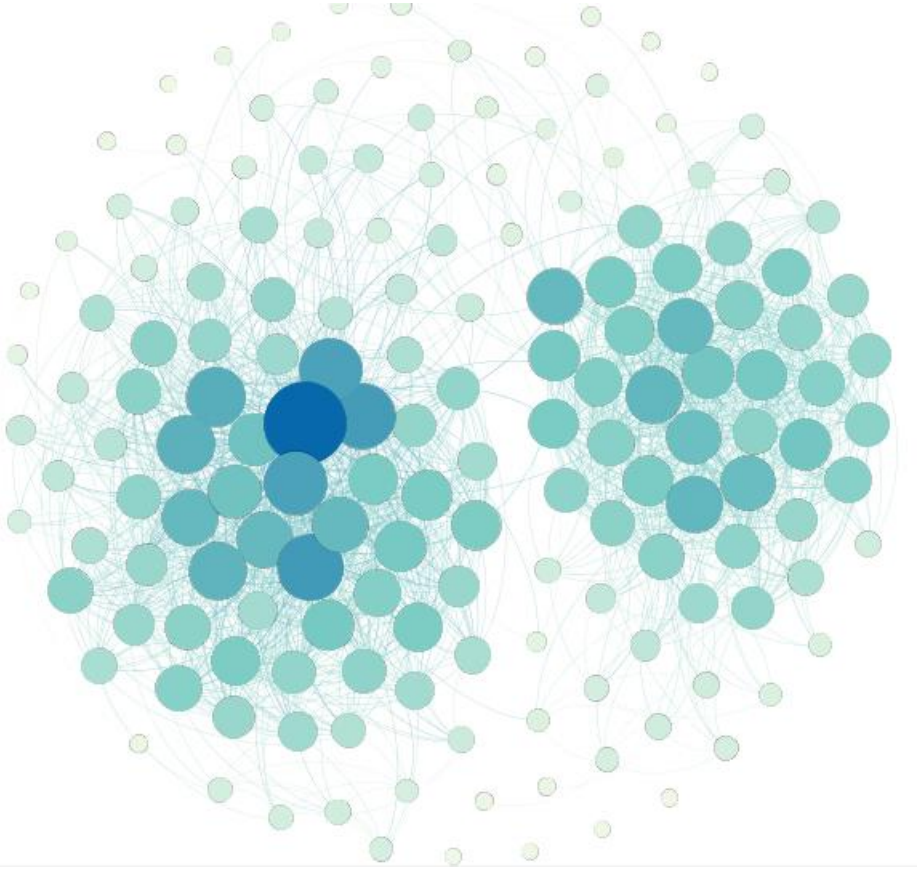
Social network analysis

ProJect 1

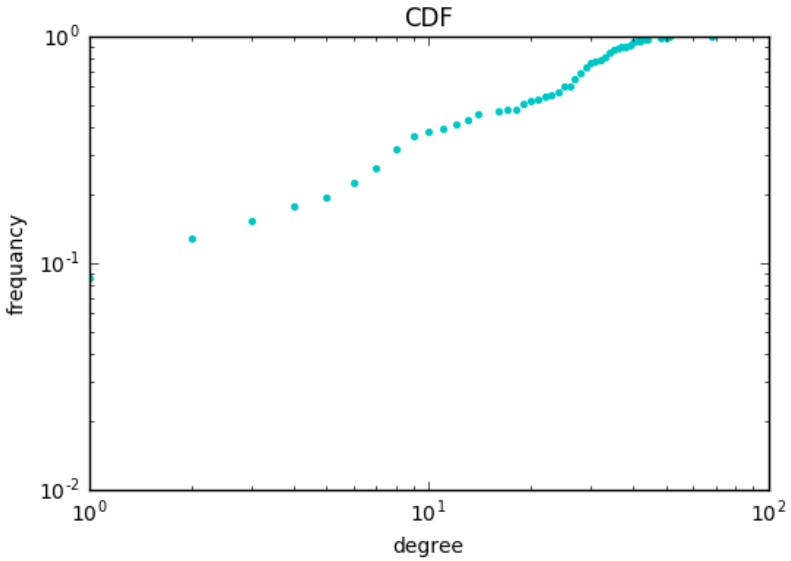
Made by:
Gerasimova Olga

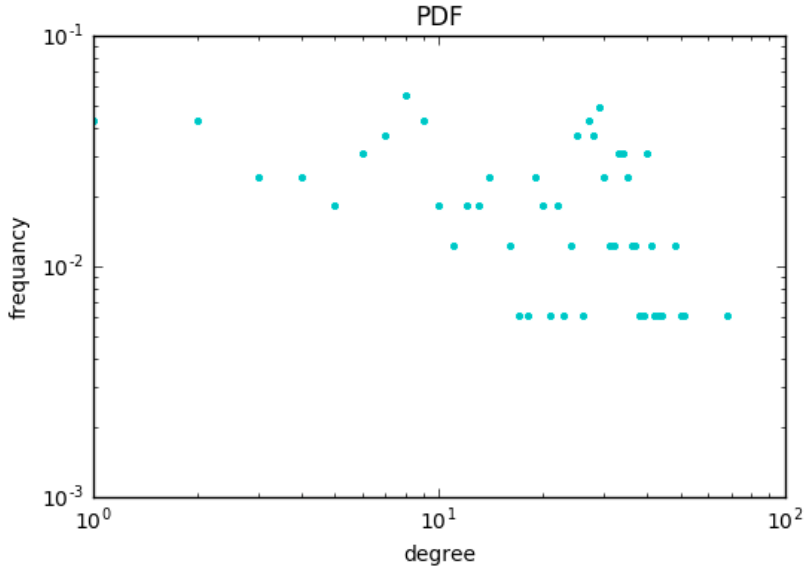
Network Summary

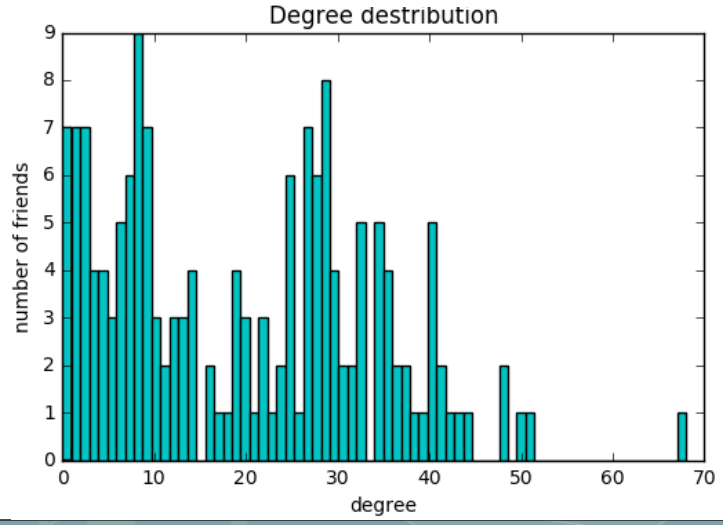
- Graph of my VK friends
- Undirected
- Size: 1600
- Order: 162
- Edge attributes: -
- Node attributes:
  - Id
  - First name
  - Last name
  - Sex
  - City
  - University



Degree distribution







Network properties

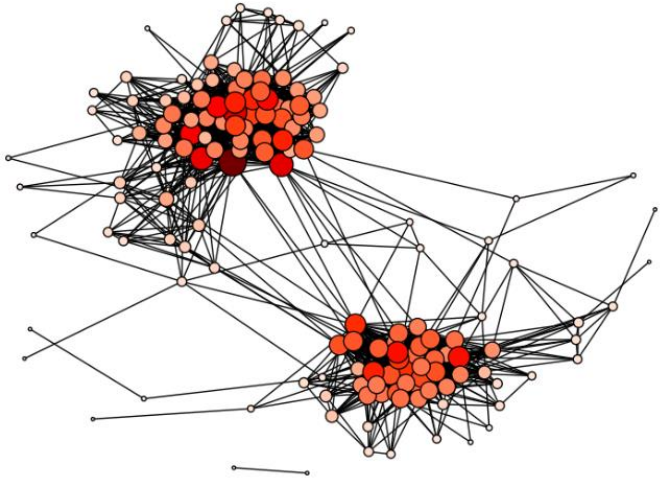
- Diameter: 6

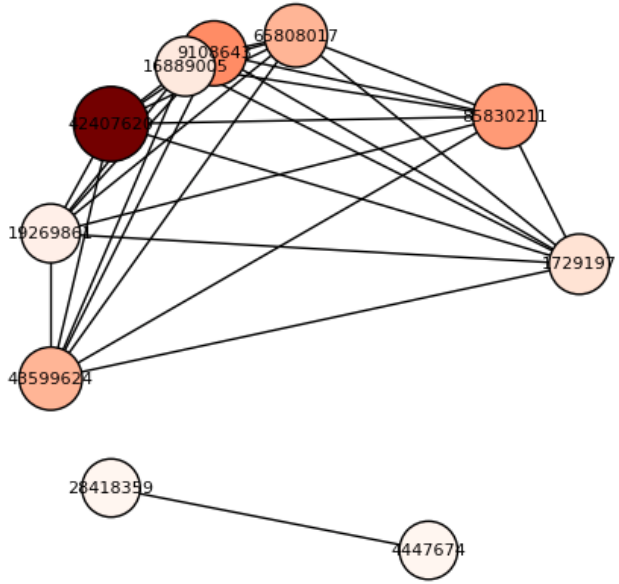
Any two my friends can know each other with at least 6 "handshakes".

- Radius: 3
- Clustering Coefficient: 0.587
- Average shortest path: 2.53

Degree centrality

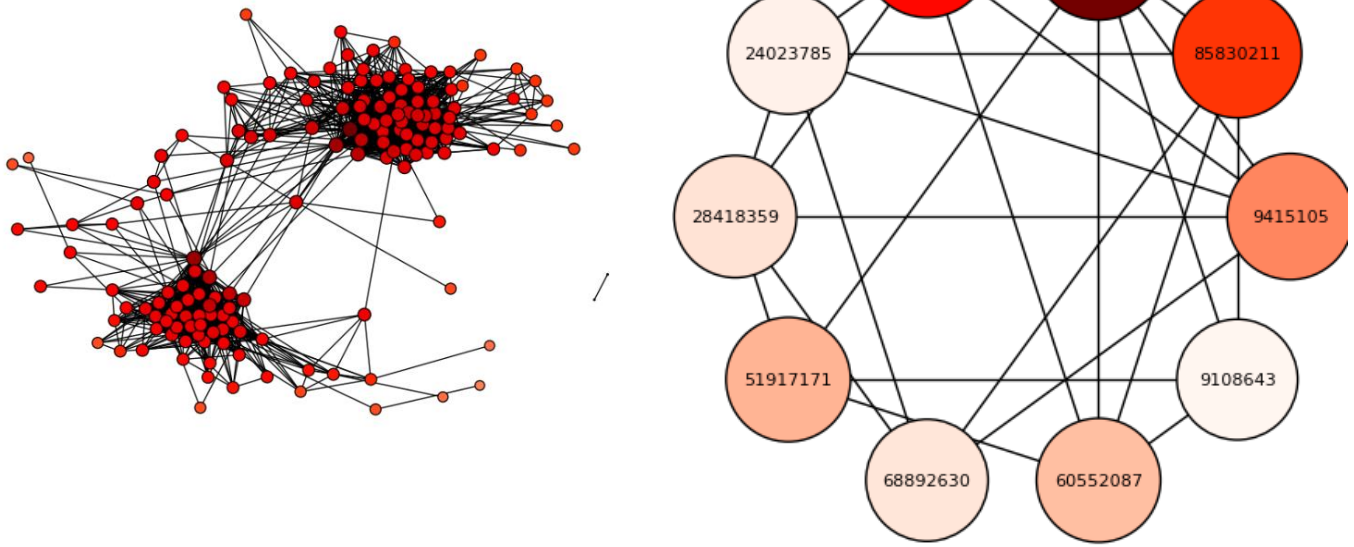
The biggest red node is one of my school friends who knows some my friends from university. Moreover, we have many common friends from physic and math camps.





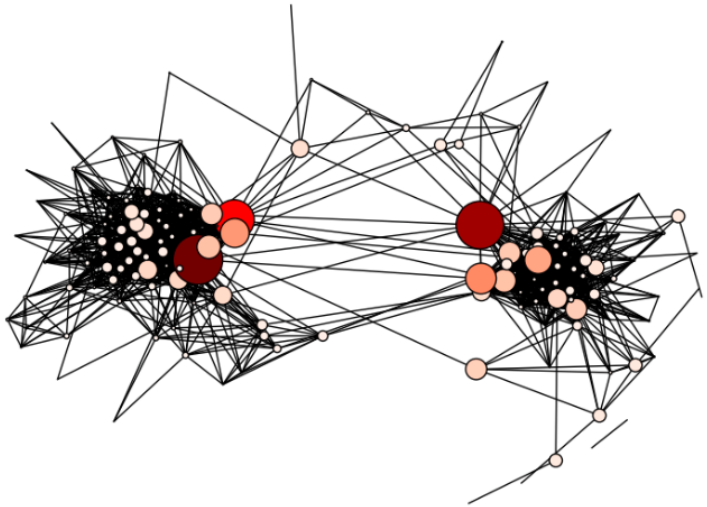
Closeness centrality

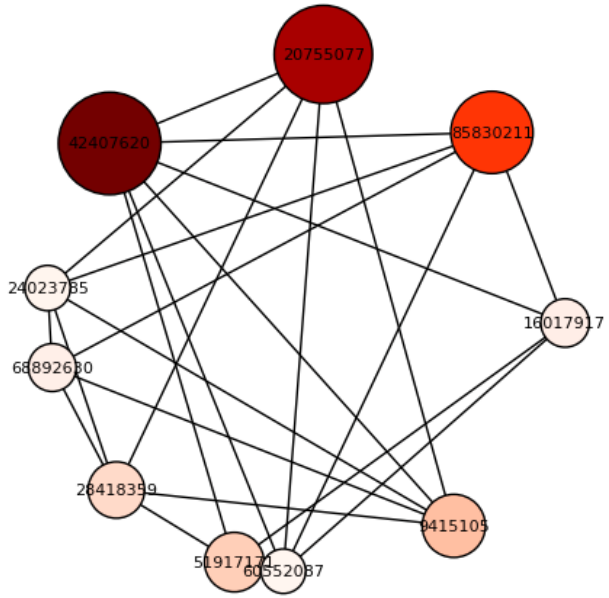
The darkest nodes are my active friends from school (friend with the highest node degree) and university (my best friend).



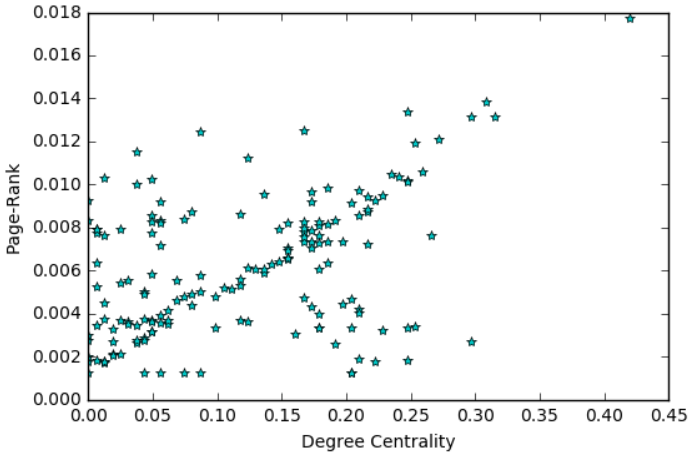
Betweeness centrality

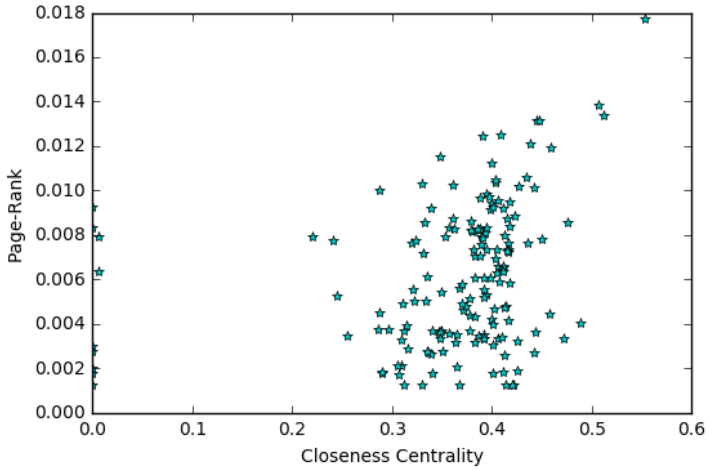
The darkest nodes are my friends from school (who enrolled with me in one university) and university (my best friend who was introduced my school friends).

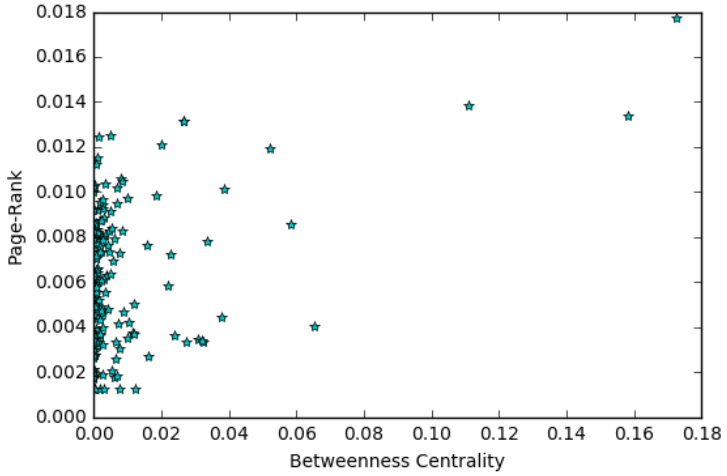




Page-Rank Comparison with centralities







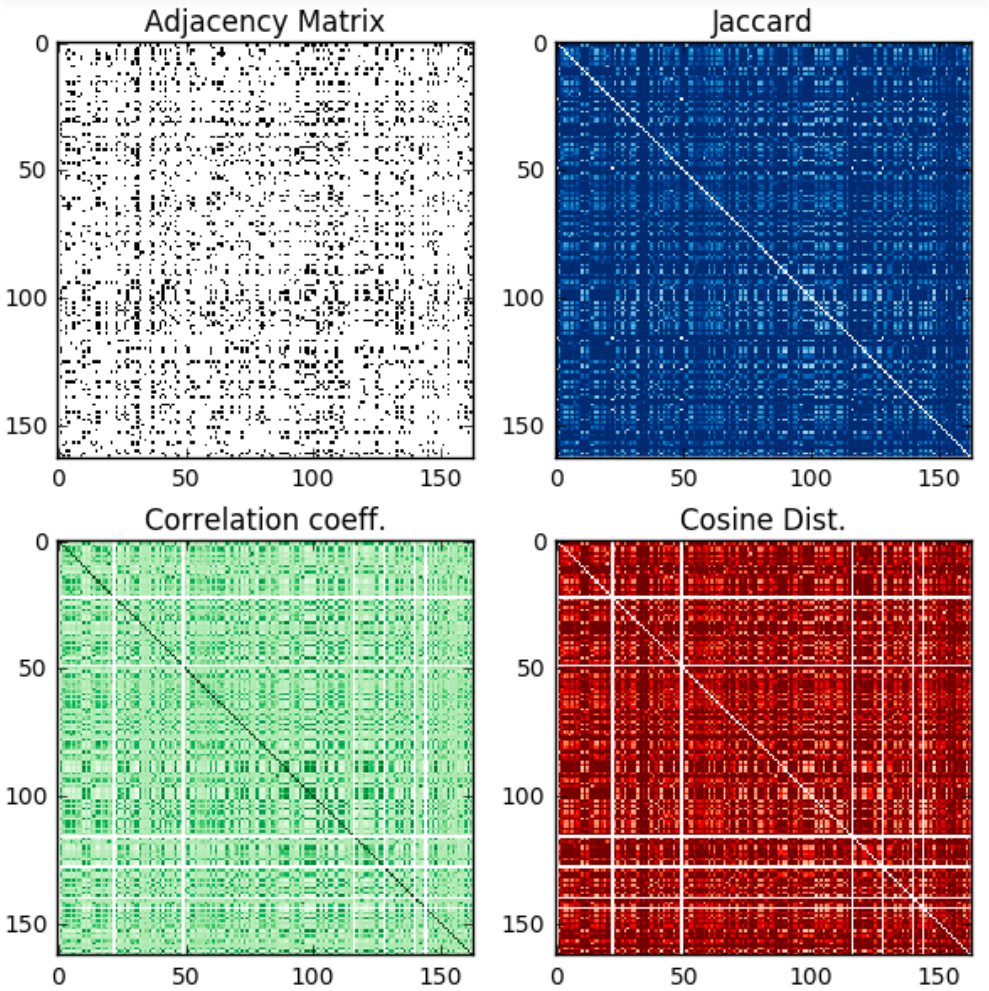
Assortative Mixing according to node attributes

Assortative Mixing coefficient shows whether nodes with the same attribute values tend to form connections.

- For gender: 0.0823
- For city: 0.0887
- For university: 0.0103
- For degree: 0.0278

We cannot see strong dependences. Probably, it is due to many missing values in choosen attributes.

Node structural equivalence/similarity



Node structural equivalence

In my graph some nodes are structural equivalent if

- ✓ two persons know only each other
- ✓ two persons are twin brothers

Random graph model (Erdos-Renyi model)

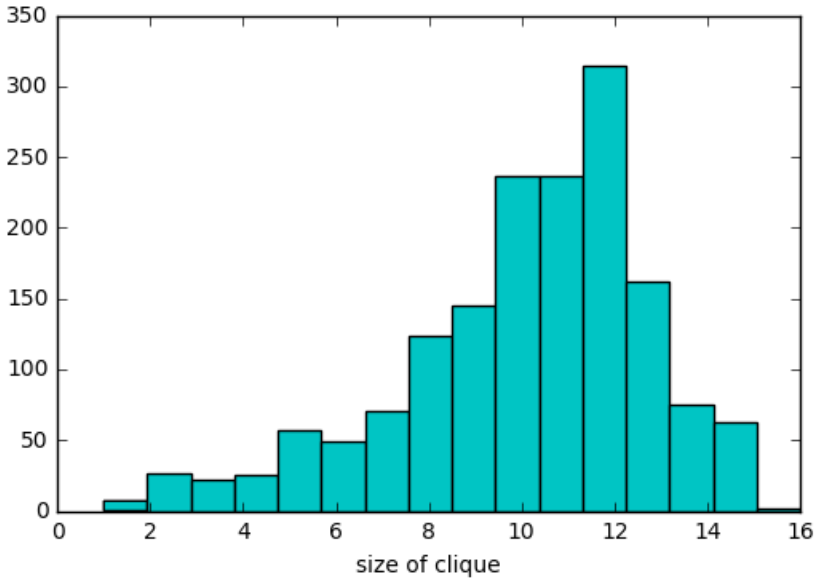
We compare some descriptive statistics:

- clustering coefficient: 0.5878 - 0.1309(ER)
- size of GCC: 154 -163 (ER)
- diameter: 6 - 3 (ER)
- radius: 3 - 3 (ER)
- average path length: 2.53 - 1.954 (ER)

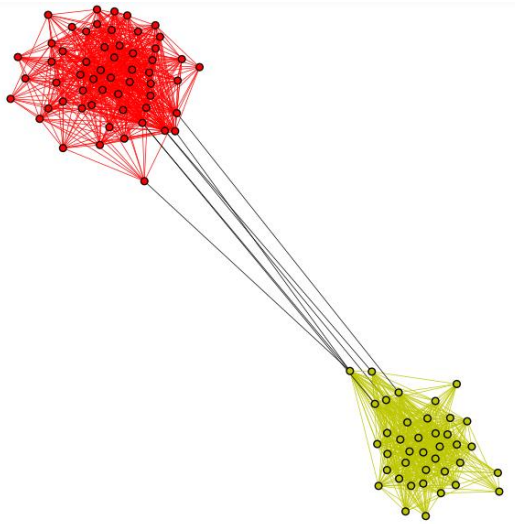
Clique search

- Number of maximal clique: 2
- Size of maximal clique: 16

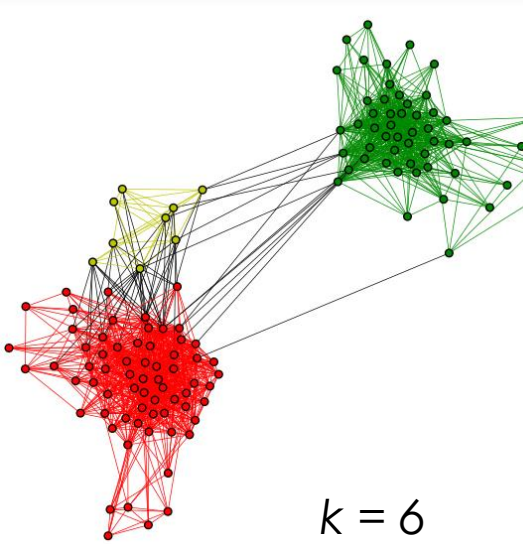
Maximal cliques are groups of university friends



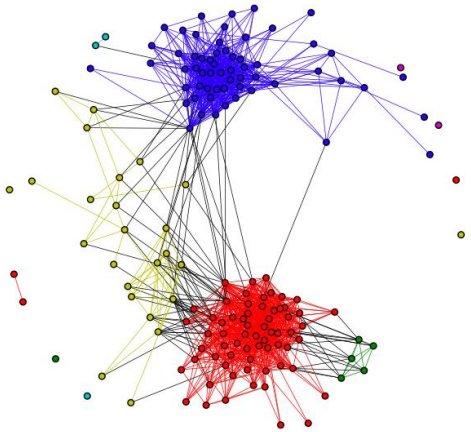
k-core subgraphs



k =10

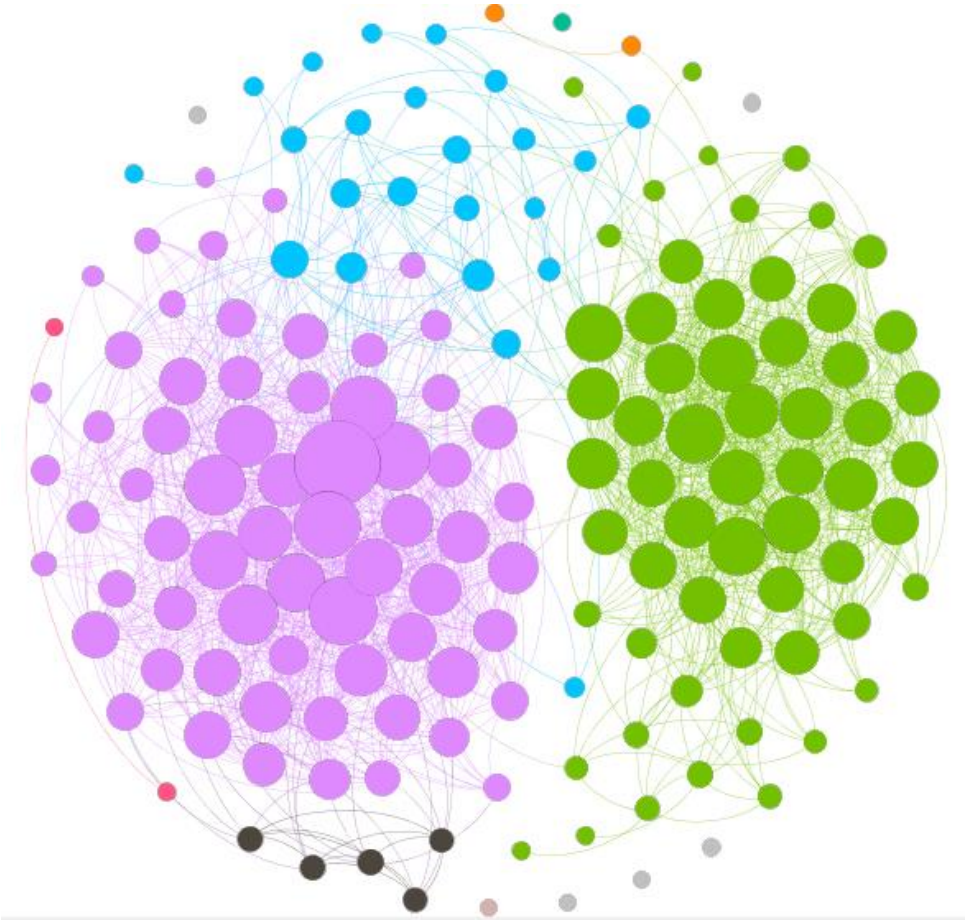


k = 6



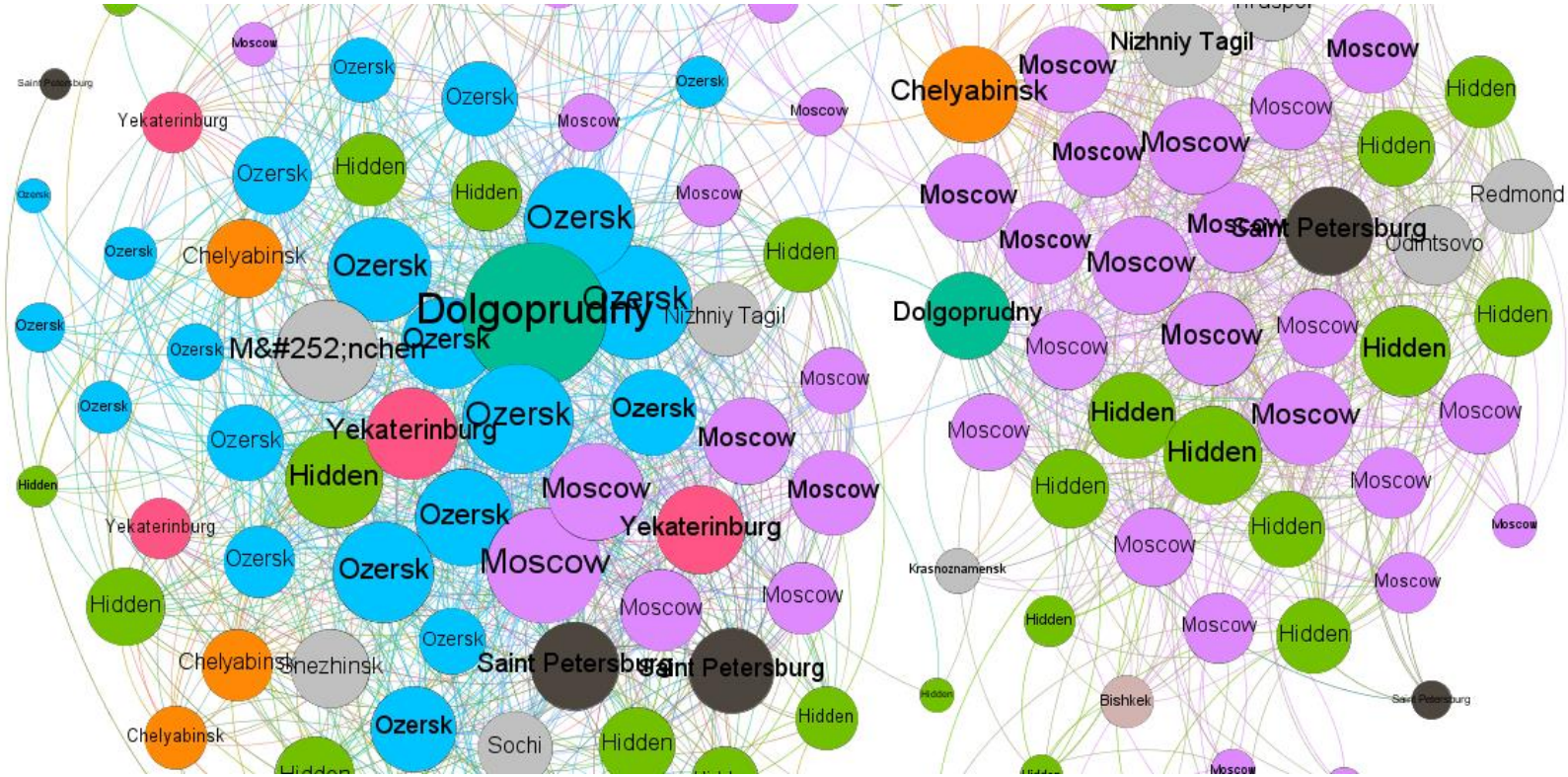
k = 1

Community detection: modularity



- University
- School
- Physic camp
- Psychology faculty
- Primary school
- Dance

Community detection: modularity (labels are cities)



Thank you !