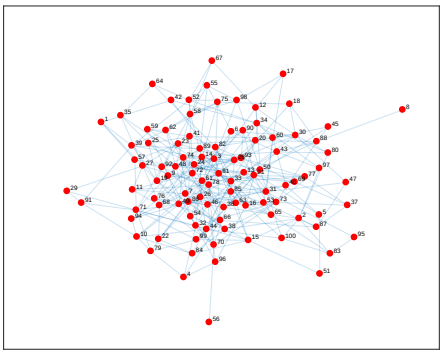
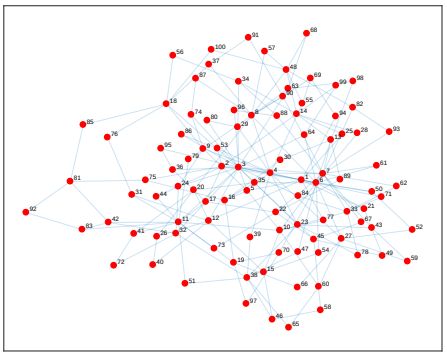
Network analysis with Matlab

Scripts and functions are taken from:
- Matlab (-> Mathematics -> Graph and Network Algorithms)
- BCT: Brain Connectivity Toolbox (https://sites.google.com/site/bctnet/)

Generate and visualize an Erdos-Renyi and a Barabasi-Albert network of 100 nodes and mean degree 6

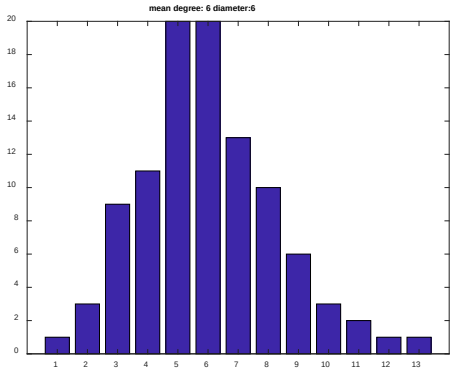
Useful commands: generateER, generateBA, graph, plot

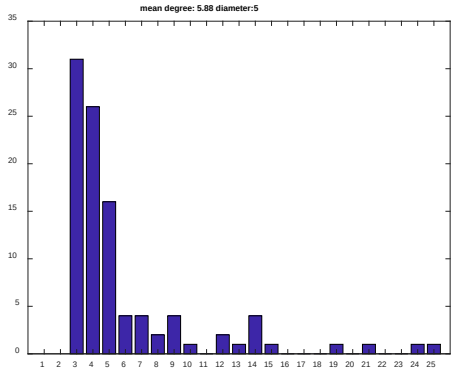




Compute network indicators: diameter, average clustering coefficient, mean degree, degree distribution

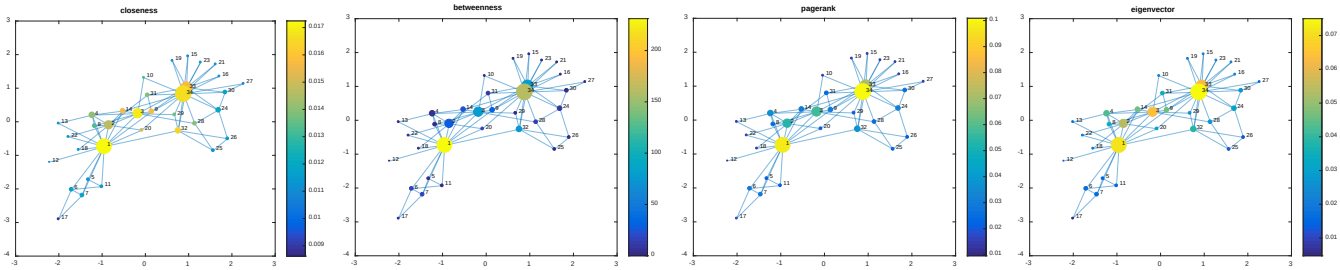
Useful commands: distances, avgClusteringCoefficient, histogram





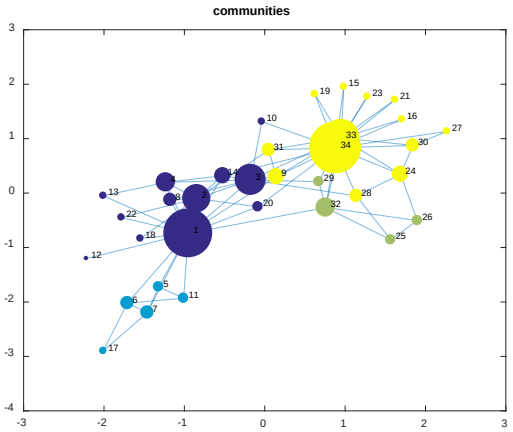
Compute and visualize centralities (closeness, betweenness,pagerank,eigenvector) of the Zachary's karate club network (datafile: 'zachary.mat')

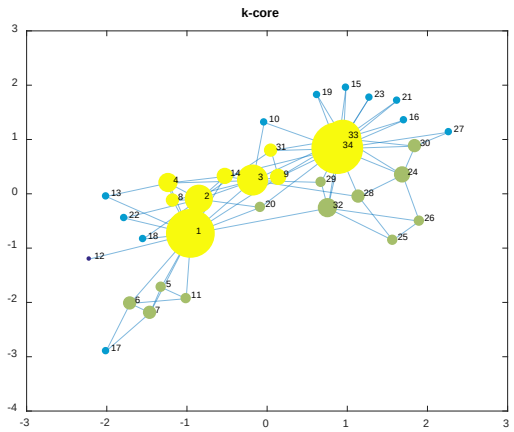
Useful commands: centrality, p.NodeCData



Compute and visualize communities (maximum modularity, Louvain algorithm) and k-core decomposition of the Zachary's karate club network (datafile: 'zachary.mat')

Useful commands: community_louvain, kcoreness_centrality_bu (kcore_bu)





Epidemics on networks

- Play on ER and BA networks (100 nodes) with a SIS process (set $\Delta = 1$, $\gamma = 0.1$, and β variable, 50% initial infected).
- Plot the graph with the current state of nodes (S/I).
- Check the asymptotic behavior.