A Broad Overview of Social Network Analysis (SNA)

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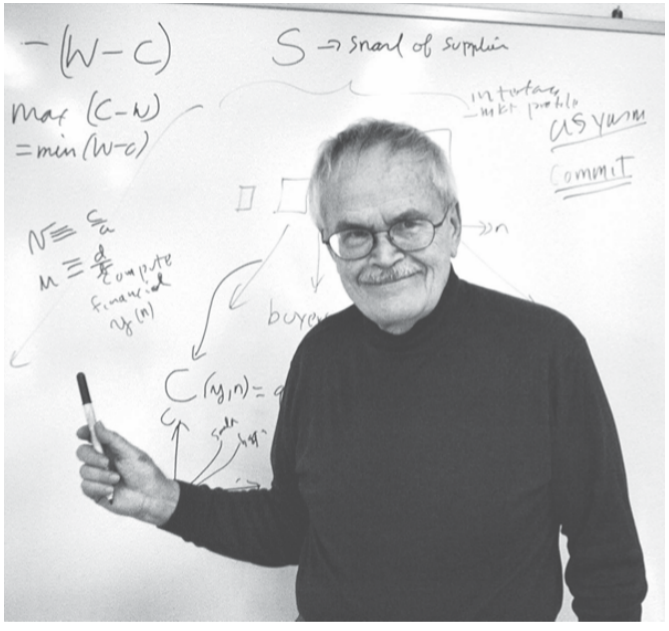
The Social Media Research Summer School 2021

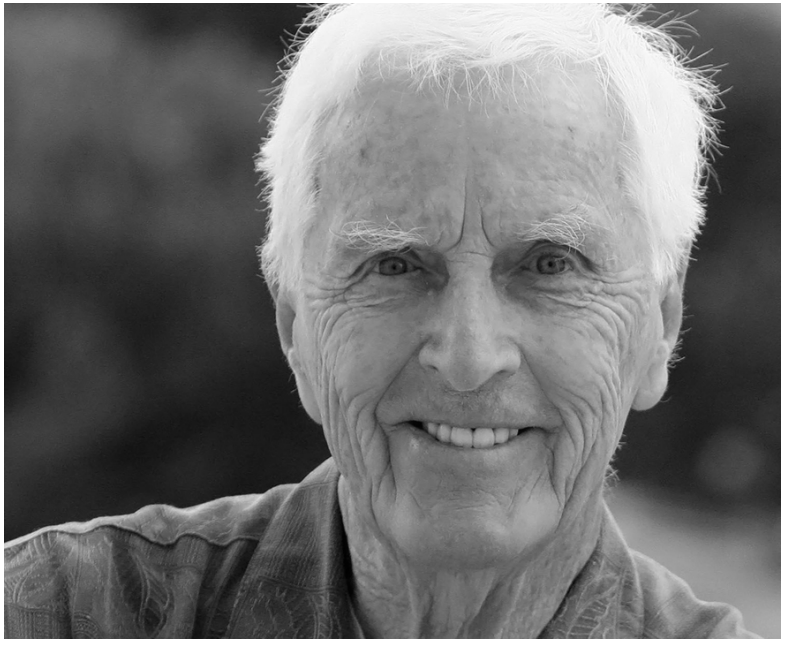
Virtual

9:45 am EDT, Tuesday, July 10, 2027

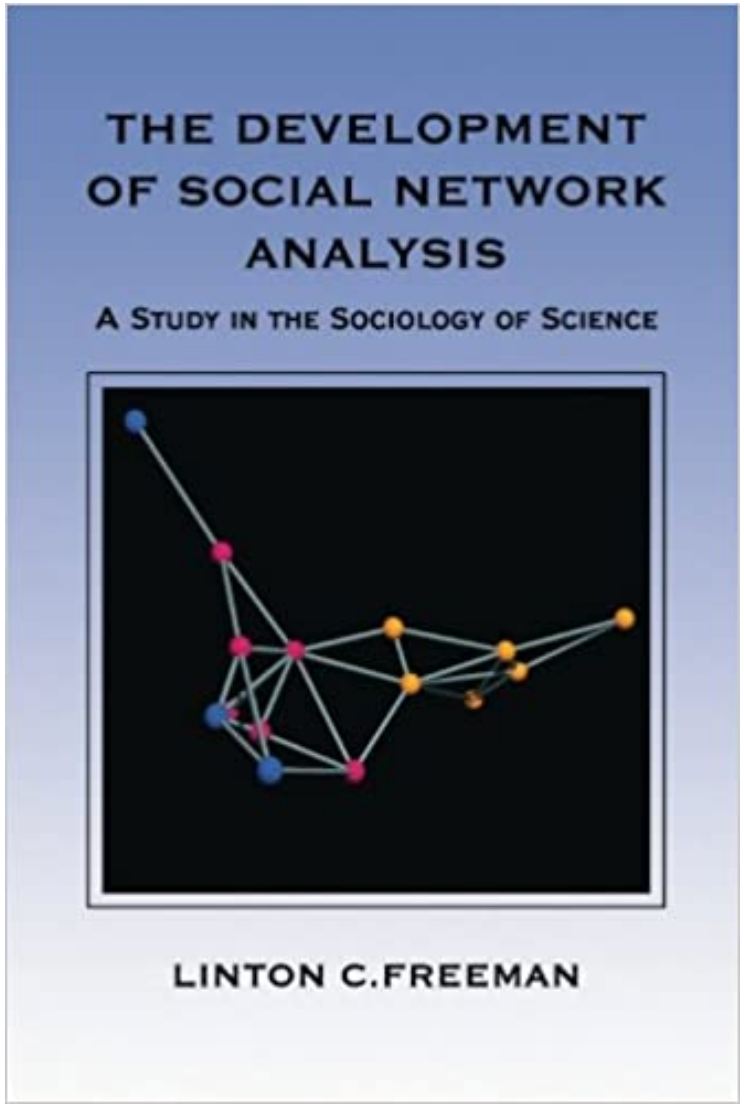
History

Georg Simmel, Jacob Moreno, Frank Harary, Harrison White, Lin Freeman





Freeman LC (2004) *The development of social network analysis: A study in the sociology of science*. Empirical Press, Vancouver.

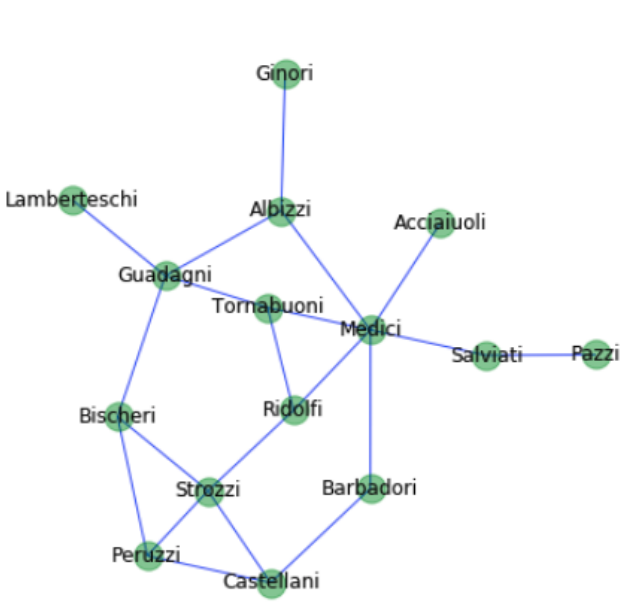


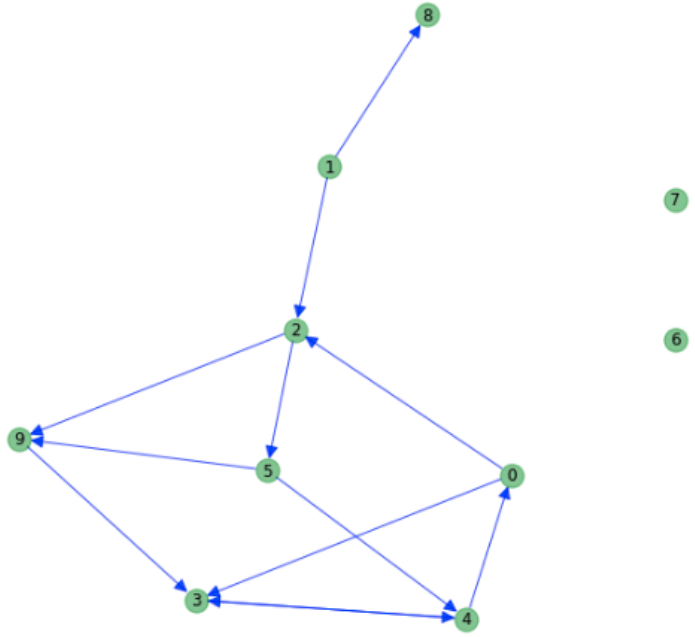
Lin Freeman's Periodization

1. Philosophical/Sociological Prehistory
2. Birth at Harvard in the 1920s
3. Birth of Sociometry in the 1930s
4. "Dark Ages I" in the 1940s
5. "Dark Ages II" in the 1950s
6. "Dark Ages III" in the 1960s
7. Renaissance at Harvard in the 1960s
8. The Normal Science of SNA after the 1990s
9. Concurrency with Network Science after the 2010s
10. The Future of Computational SocSci/SNA

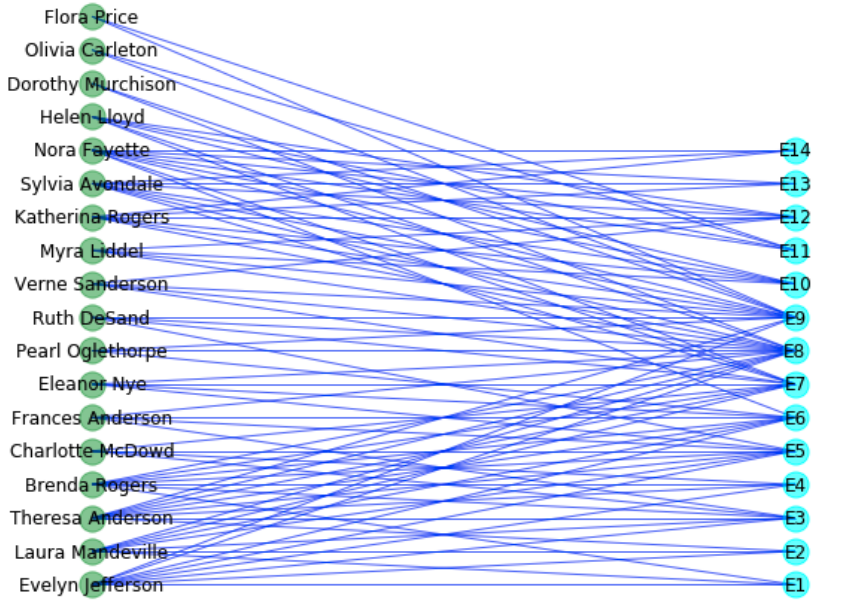
Graph/Networks Typology

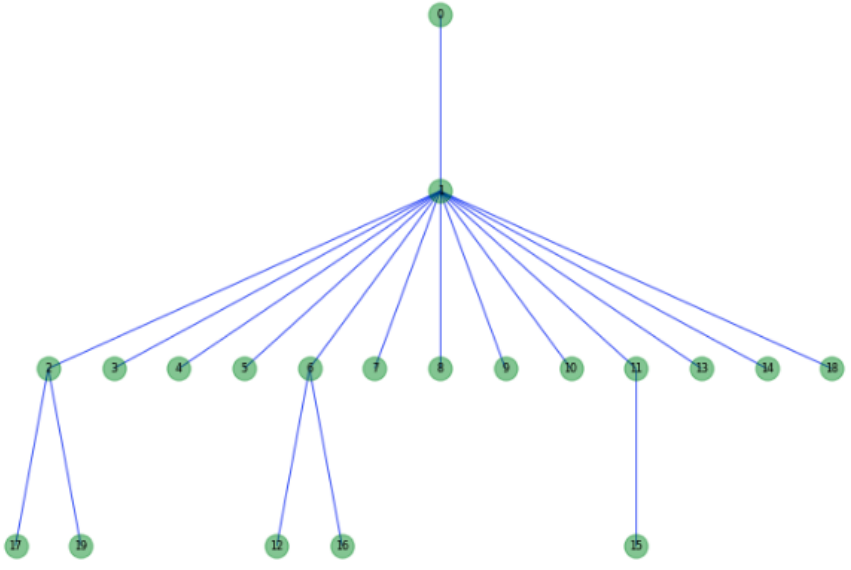
Undirected or Directed (Simple)



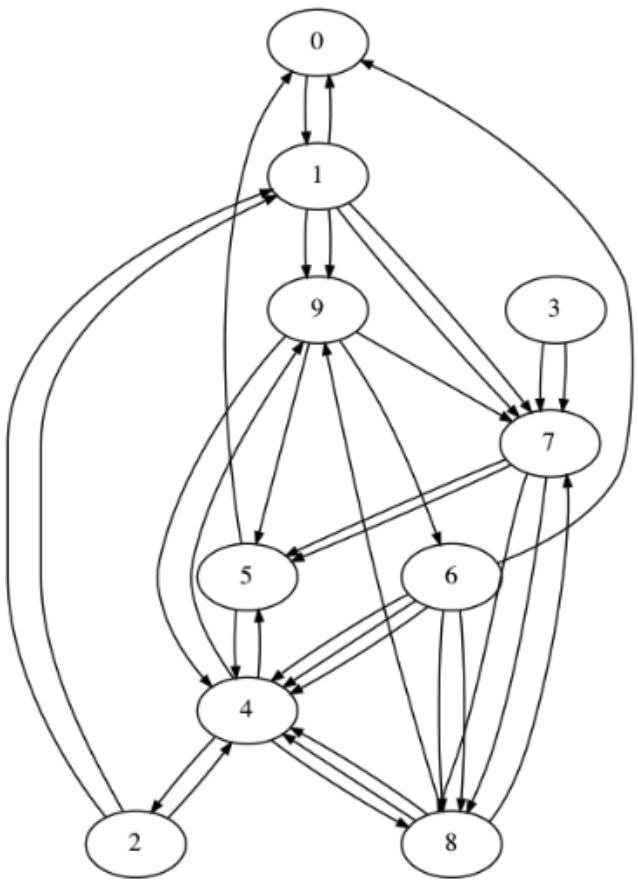


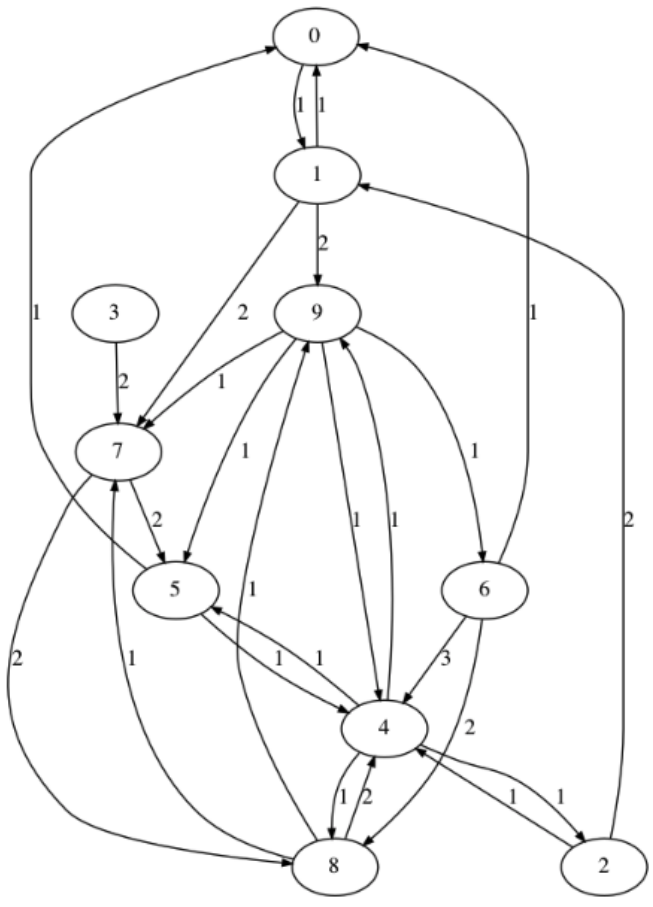
Bipartite [Two–Mode] – Tree



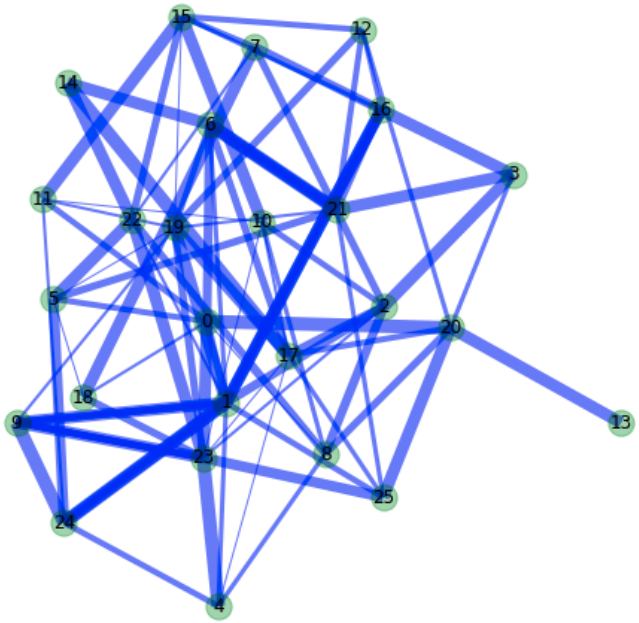


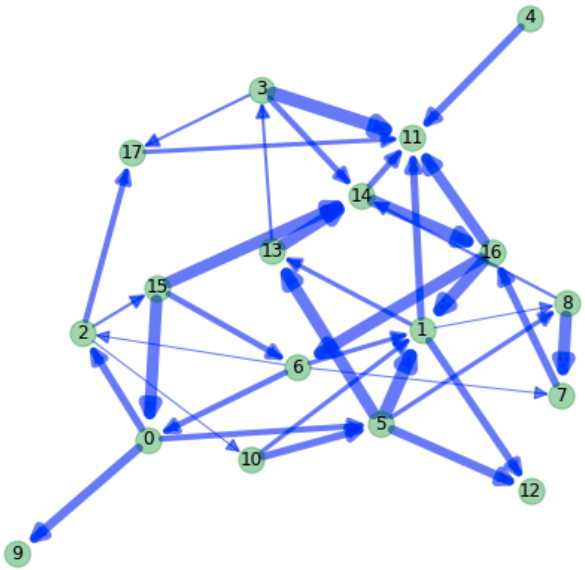
Multigraph [Edge Weighted] Undirected or Directed (with Egde Weight)



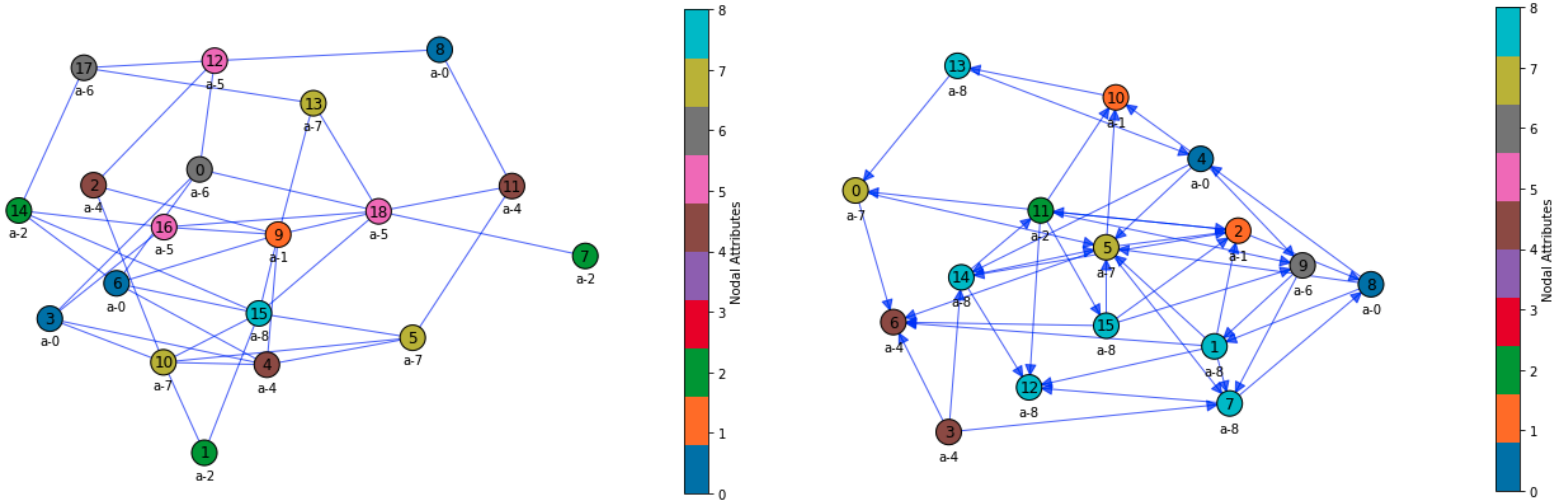


Multigraph [Edge Weighted] Undirected or Directed (with Edge Width)



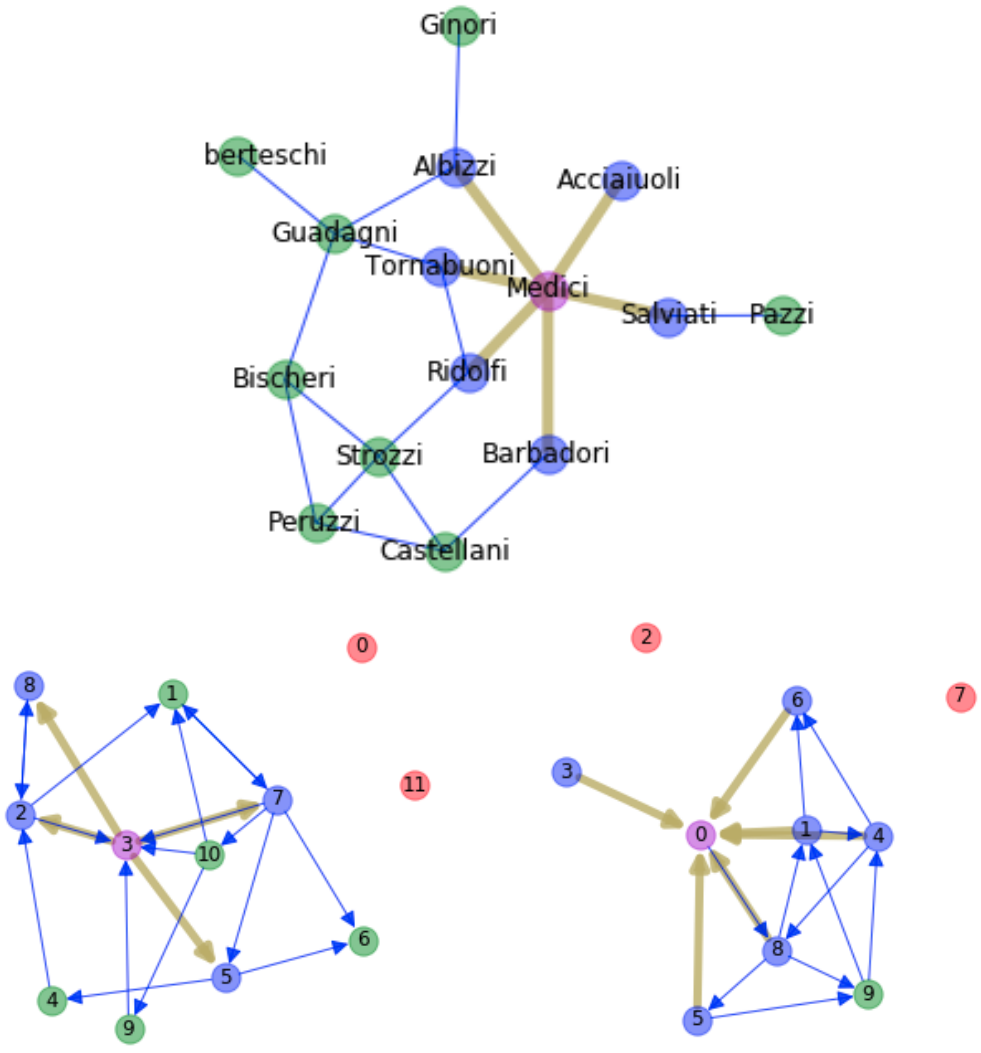


Node Labeled Undirected or Directed (with Node Attributes)

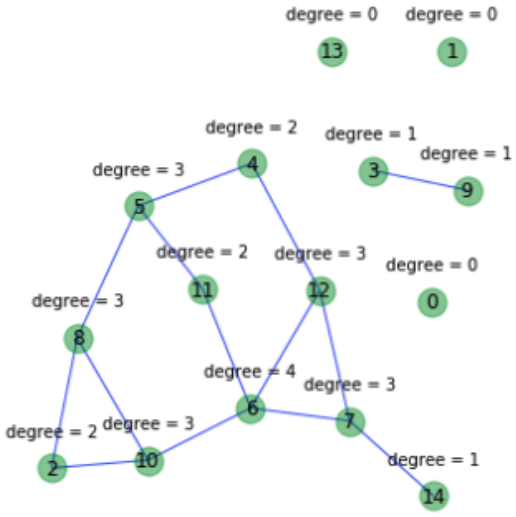


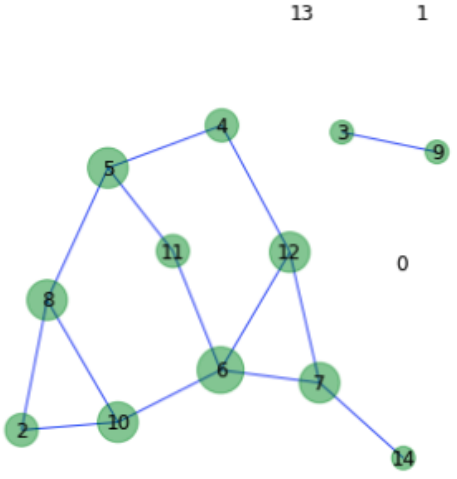
Adjacency

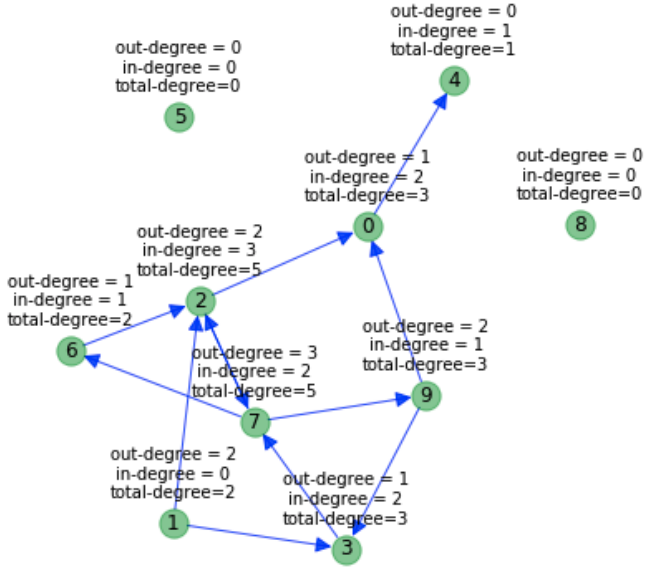
Neighbors, In-Coming, Out-Going



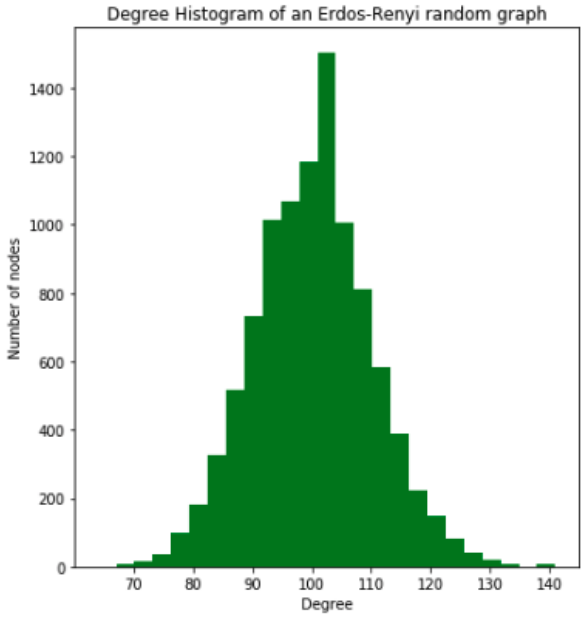
Degrees, In-Degrees, Out-Degrees

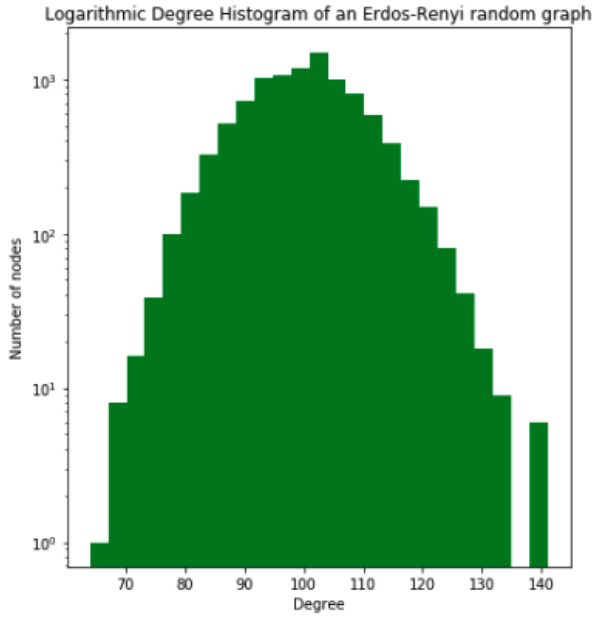


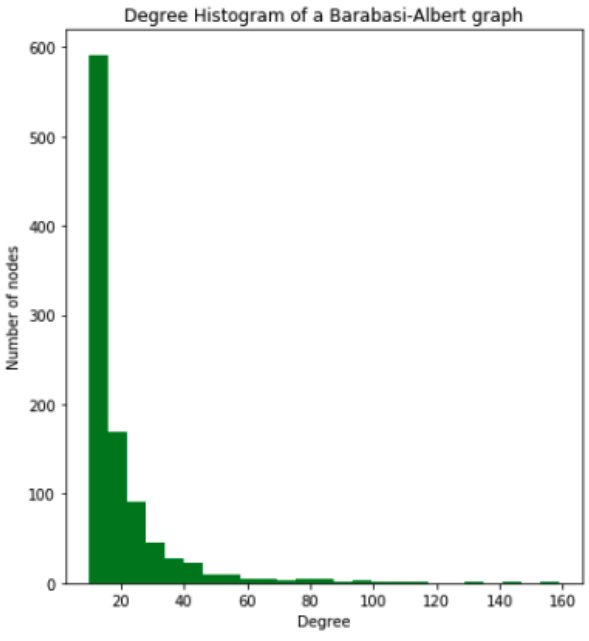


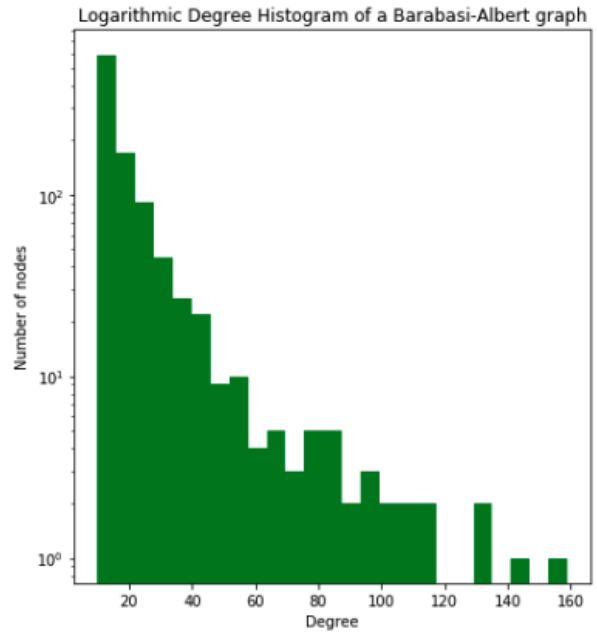


Degree Histograms

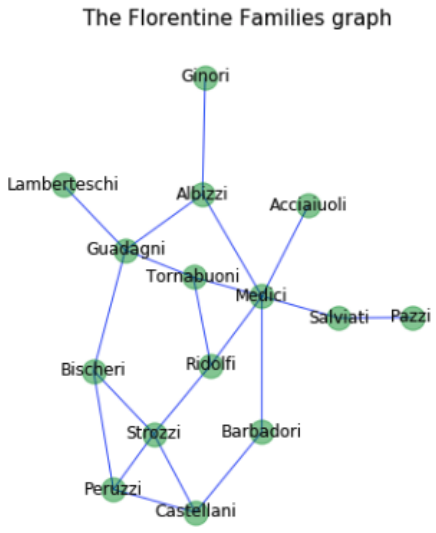


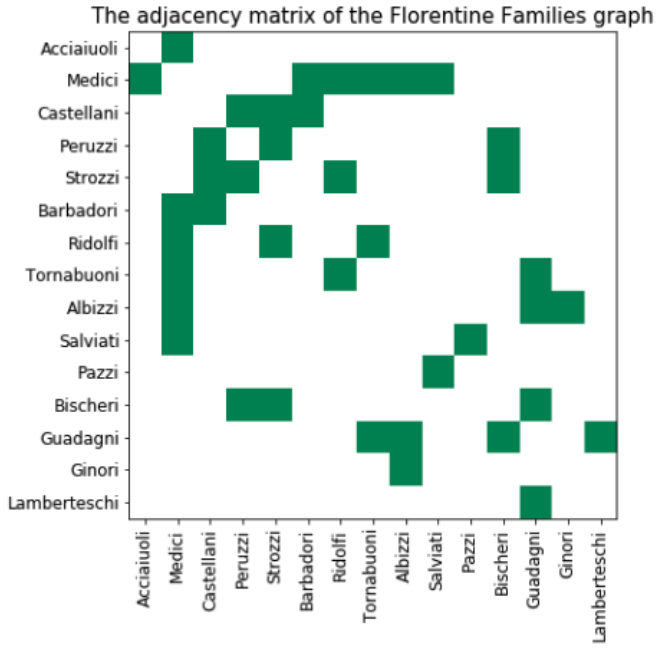


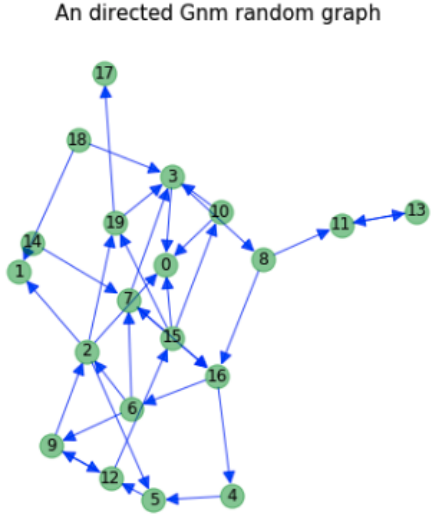


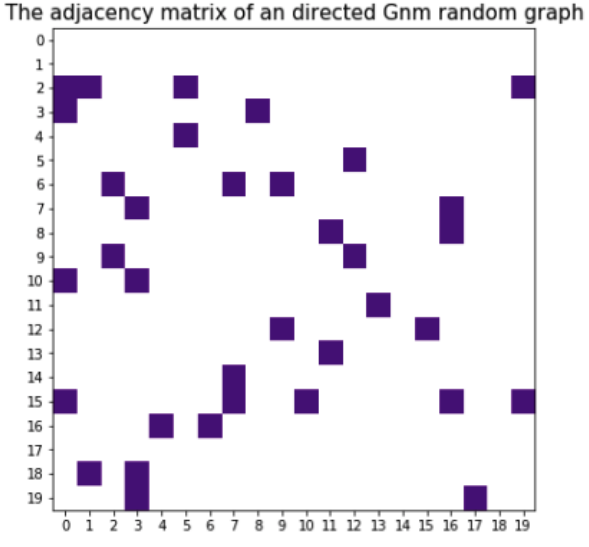


Adjacency Matrices of Simple Graphs



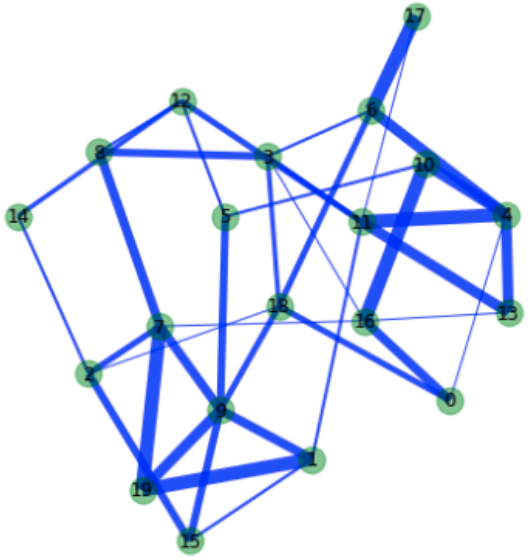


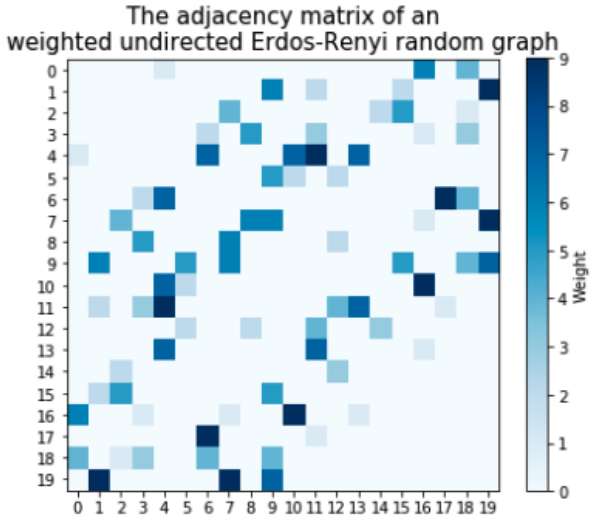




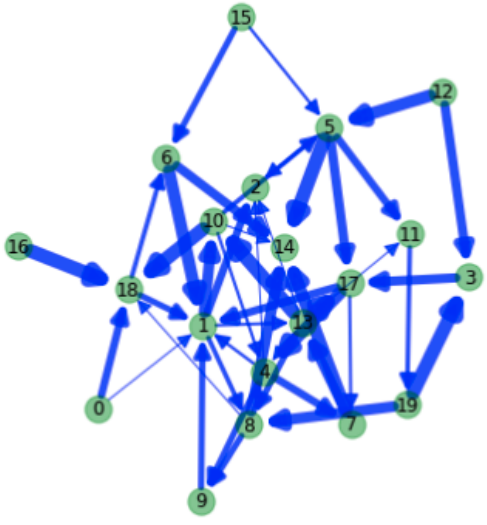
Adjacency Matrices of MultiGraphs

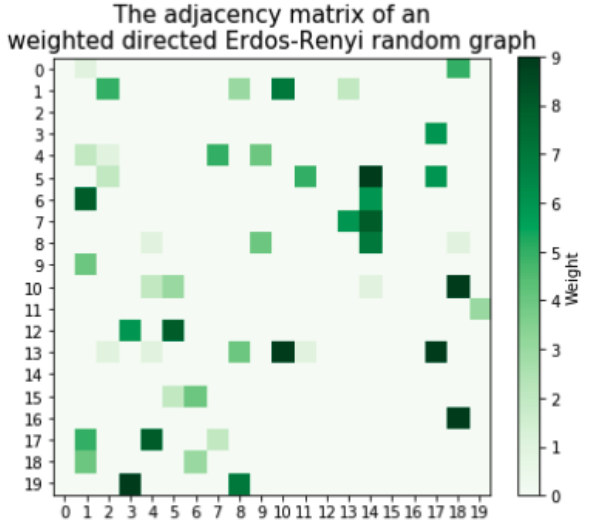
An weighted undirected Erdos-Renyi random graph





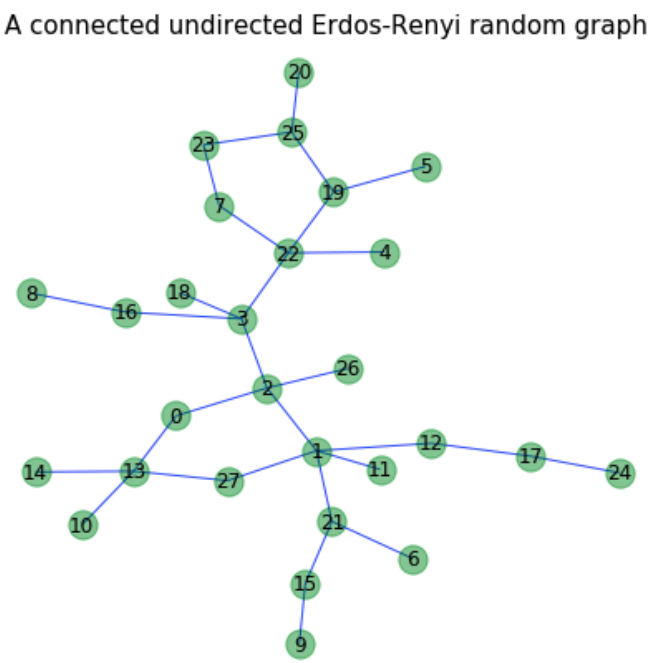
An weighted directed Erdos-Renyi random graph

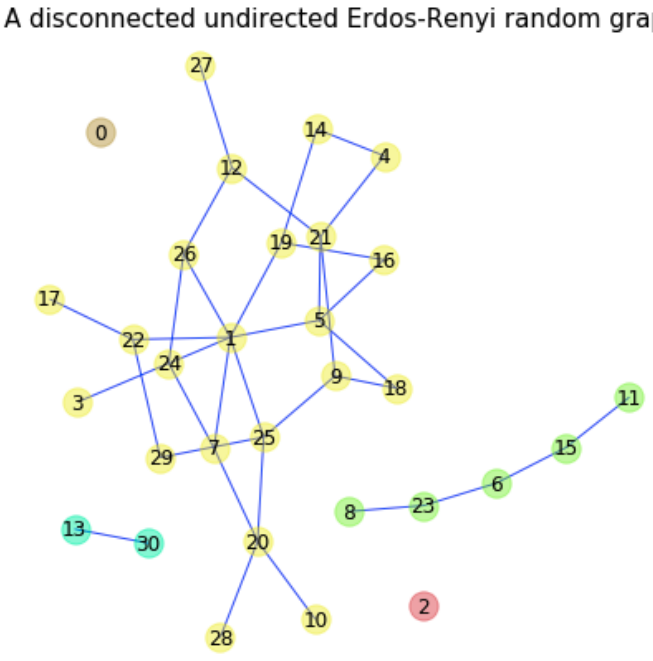




Connectedness

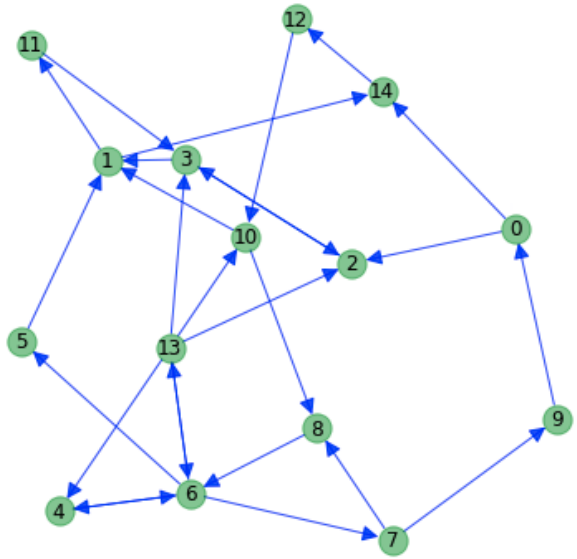
Connected and Disconnected Simple Undirected Graphs



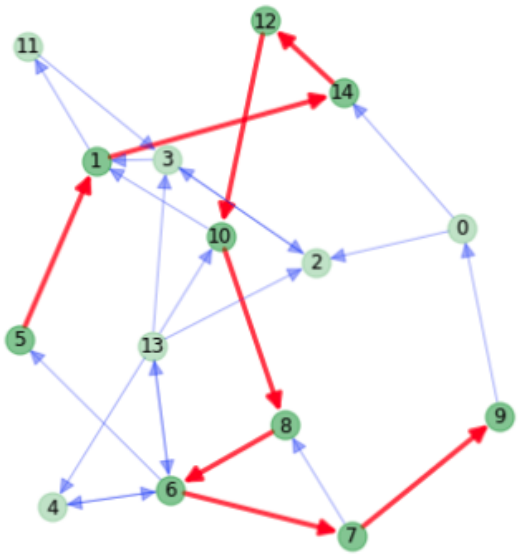


Strongly Connected Simple Directed Graphs

A strongly connected directed Erdos-Renyi random graph



The geodesic path from node 5 to node 9 in the previous graph



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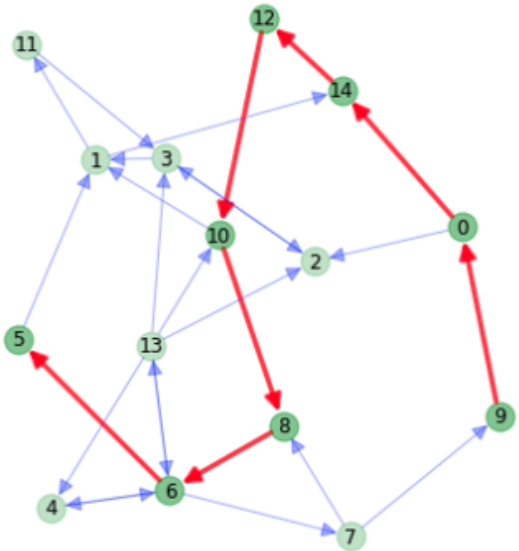
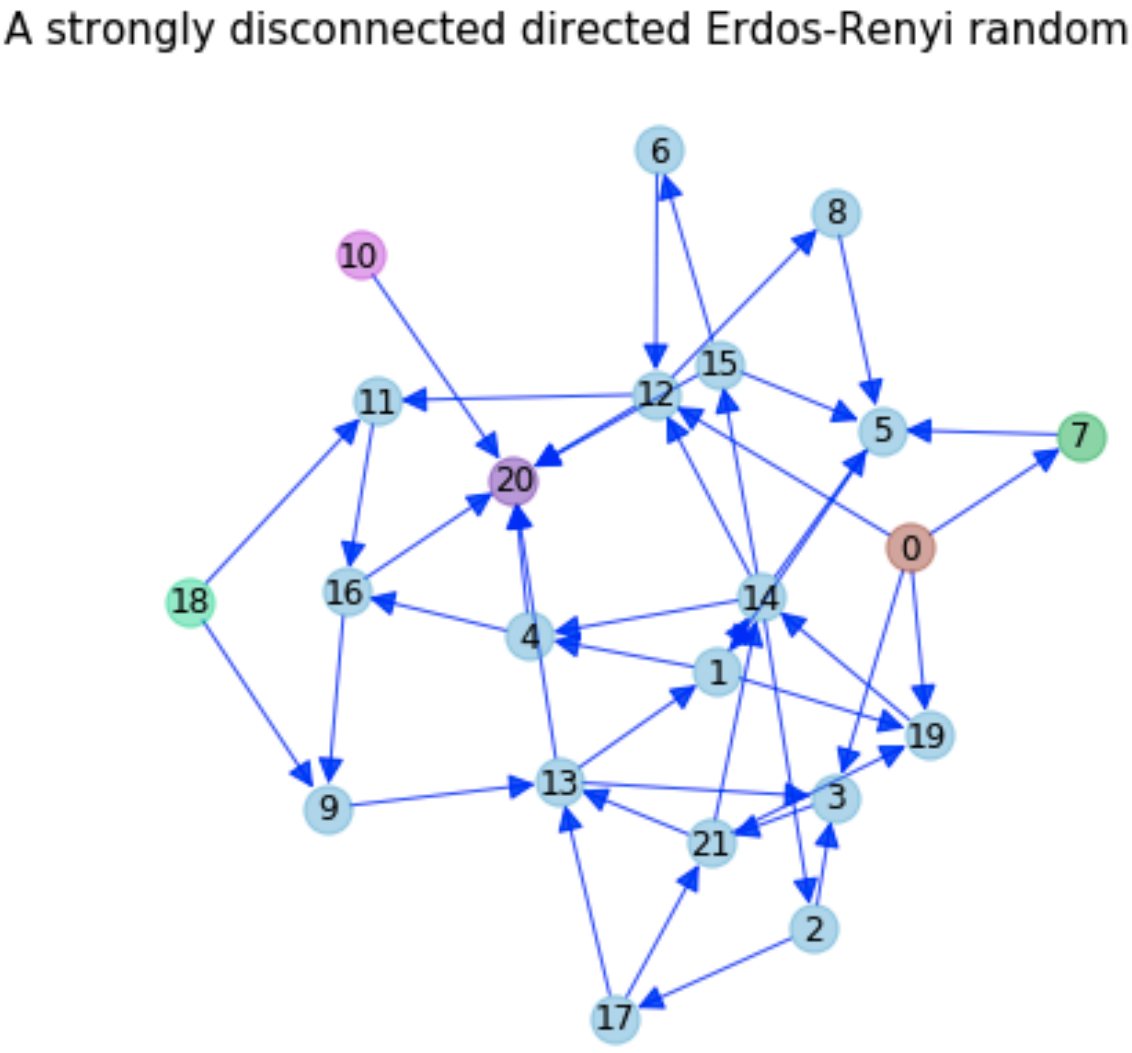
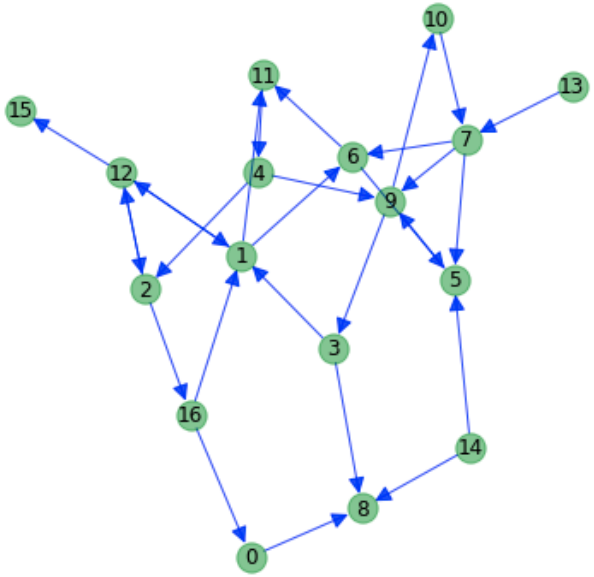


Strongly Disconnected Simple Directed Graphs

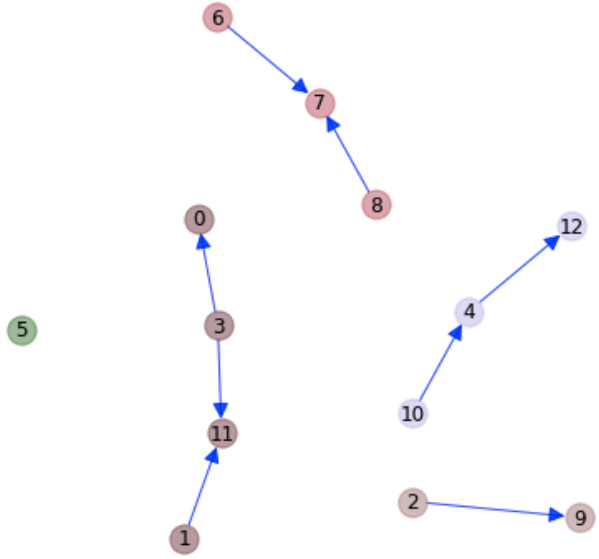


Weakly Connected and Disconnected Simple Directed Graphs

A weakly connected directed Erdos-Renyi random graph

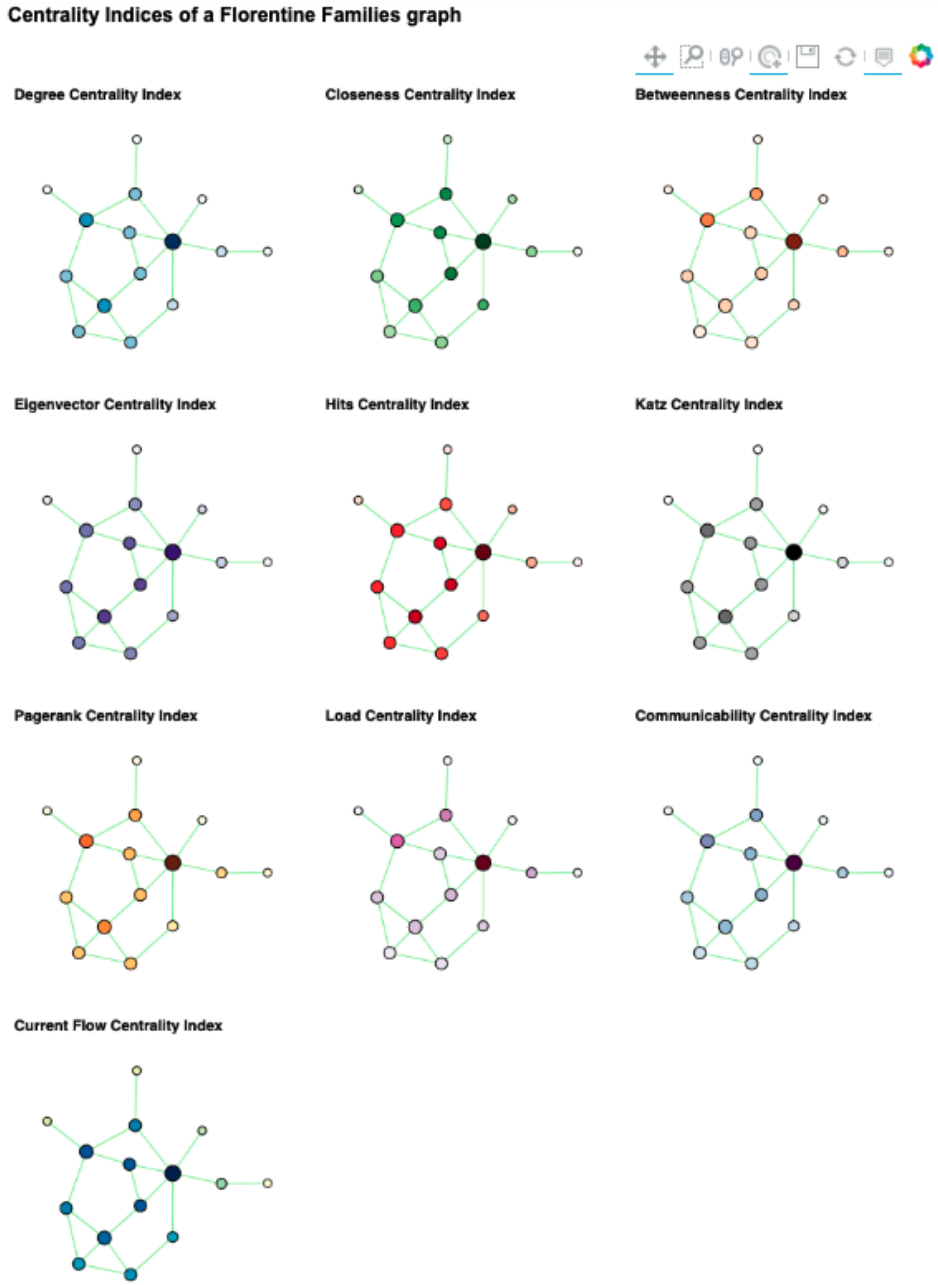


A weakly disconnected directed Erdos-Renyi random graph

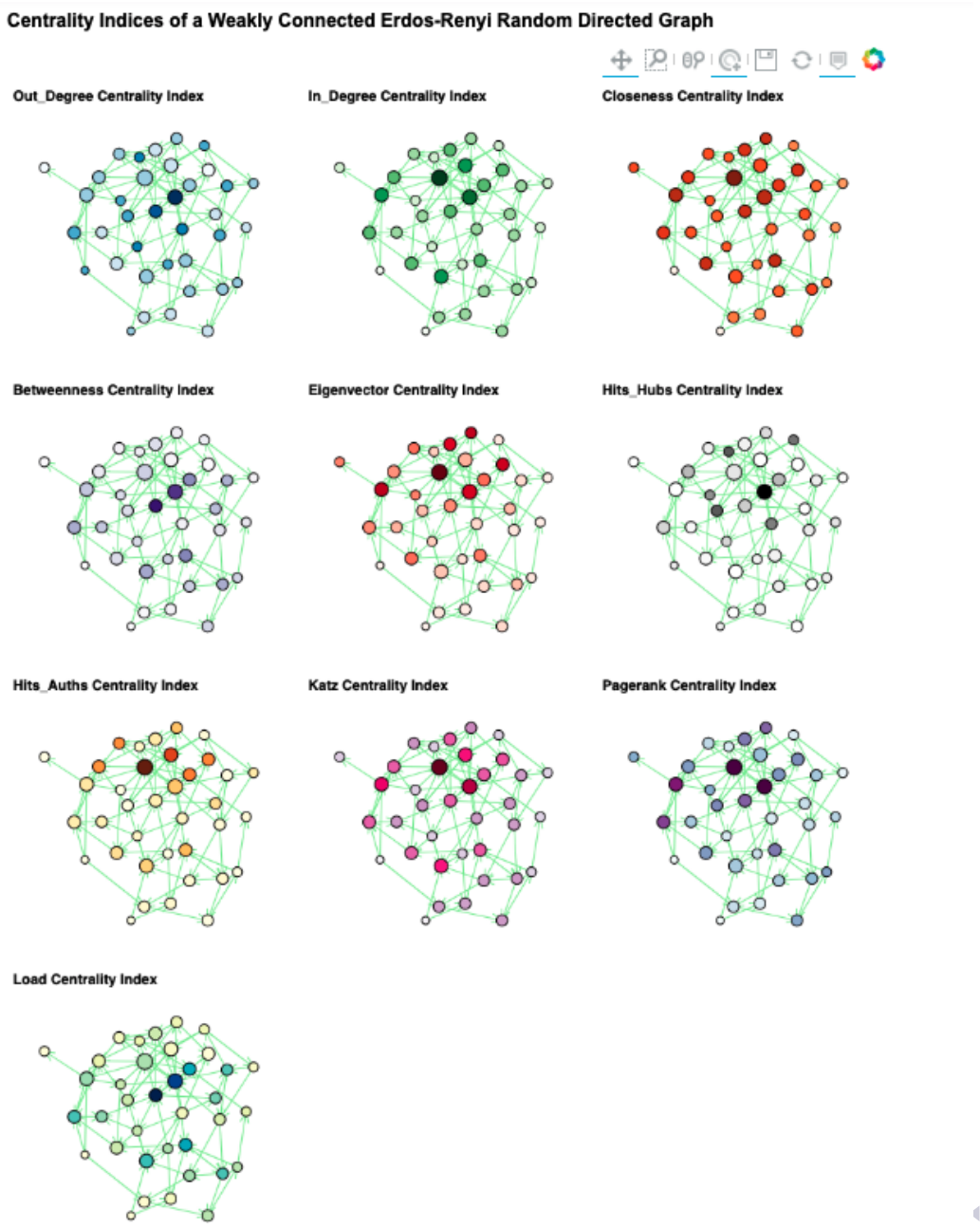


Centrality Measures

Centrality Indices of Undirected Graphs

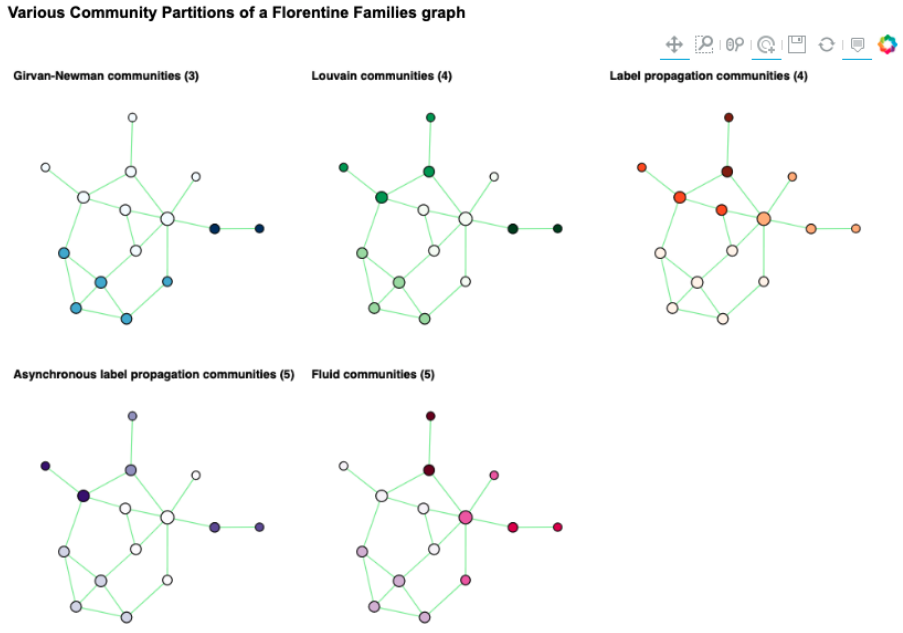


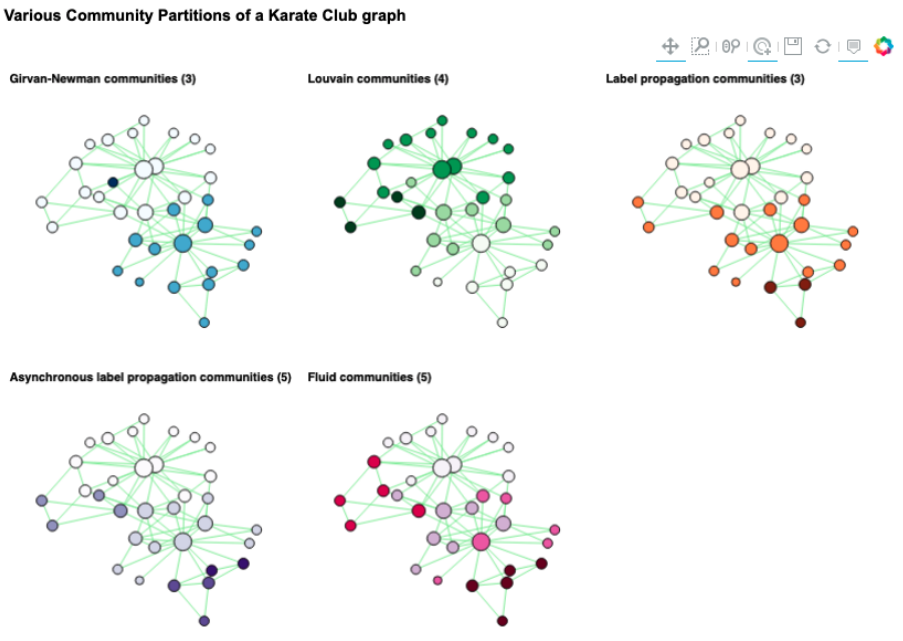
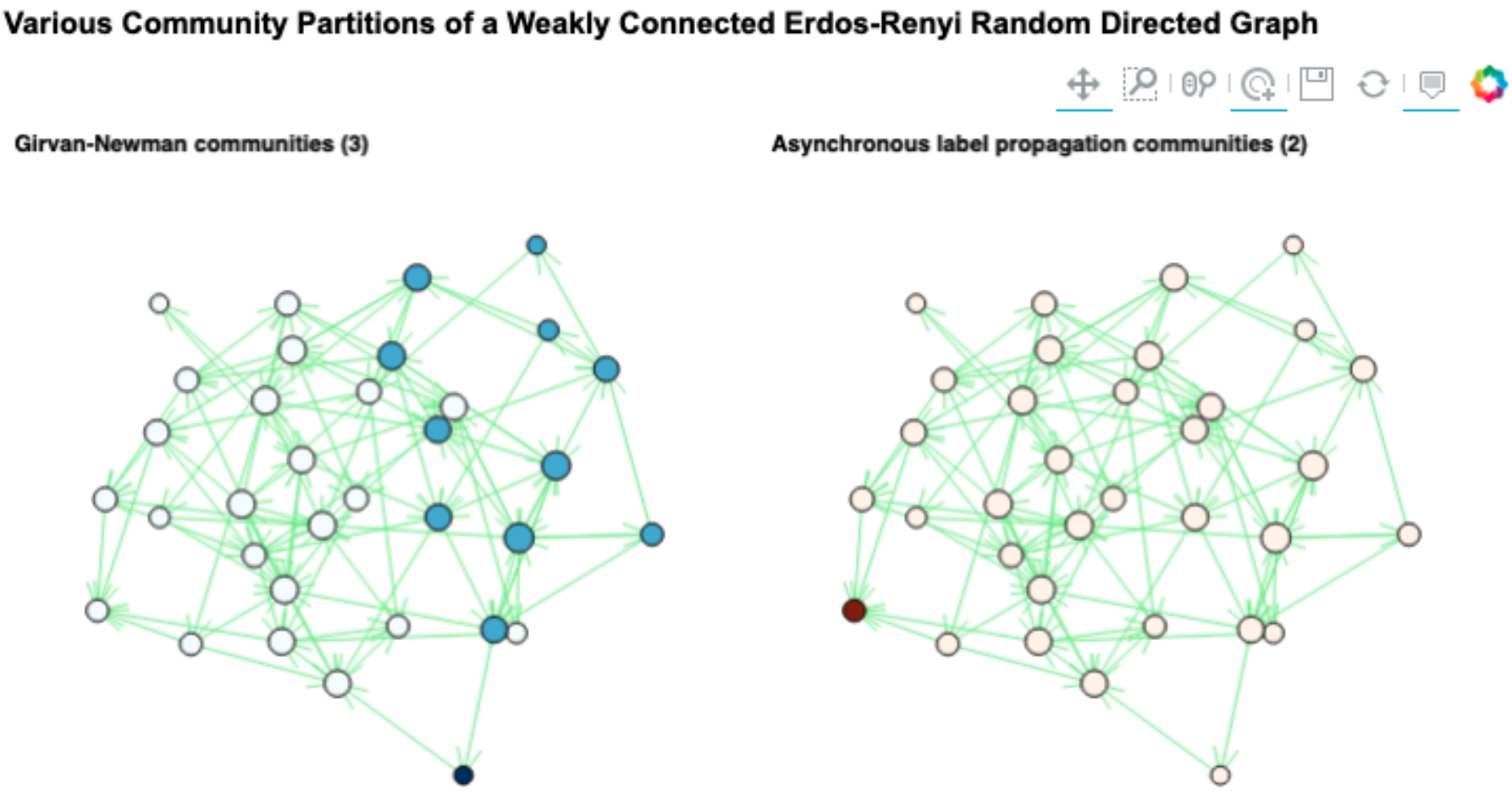
Centrality Indices of Directed Graphs



Community Partitions

Community Partitioning of Undirected Graphs





Community Partitioning of Directed Graphs