

Exercises for Statistical analysis of network data – Sheet 3

1. Is the graph C_4 the cycle graph on 4 nodes strictly balanced?
2. Is the graph of a tadpole of a cycle with 5 nodes joined to a 3-node tail, e.g. a graph on $5+3=8$ vertices strictly balanced?
3. Count the number of triangles in the graph below, excluding the large connected components of the biggest connected component.

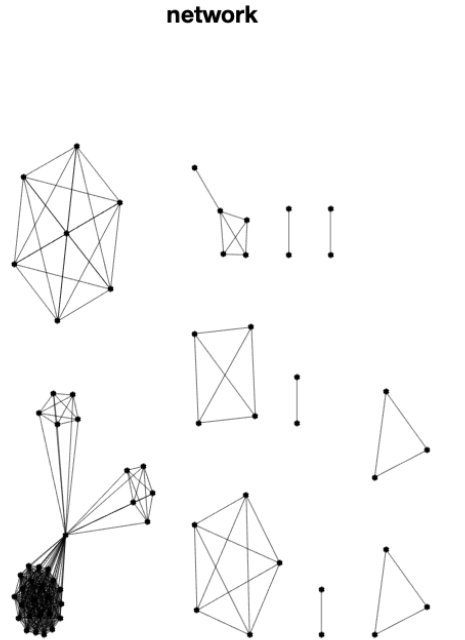


Figure 1: Plot of a graph.

4. Assume that G is an Erdos-Renyi graph on n nodes. Determine the large sample approximation to the distribution of $X_{C_4}(G)$. Chose the success probability of the Erdos-Renyi graph so that a known limit arises.
5. Assume that G is a Stochastic Blockmodel with 2 groups on n nodes. Determine the large sample approximation to the distribution of $X_{C_4}(G)$. Chose the success probability of the Erdos-Renyi graph so that a known limit arises.
6. What is the automorphsm group of K_4 ? How large it is?