

Problem2 Graph generation

Degree distribution of random graph

The degree distribution is almost like a normal distribution, and is the direct consequence of central limit theorem, that the sum of i.i.d. random variables is close to a normal distribution. Since in each step, vertices are selected at random, so their degrees becomes the sum of random variables $\{0, 1\}$.

Degree distribution of small world graph

The degree distribution has a peak at 3 because, every node is at least connected to three other nodes. The degree falls very rapidly because only few nodes get a chance to be selected again and again as the increasing degree further increases the chances of them being selected.