MLN ASSIGNMENT 2 REPORT

Question 1:

a.) Here the network is generated according to the Barabasi-Albert model. Whenever there is an incoming node the probabilities are calculated for all the nodes. Now roulette wheel is made to do selection according to the probability distribution so that there is preferential attachment of nodes in the network.

b.) The degree distributions at intermediate steps are:

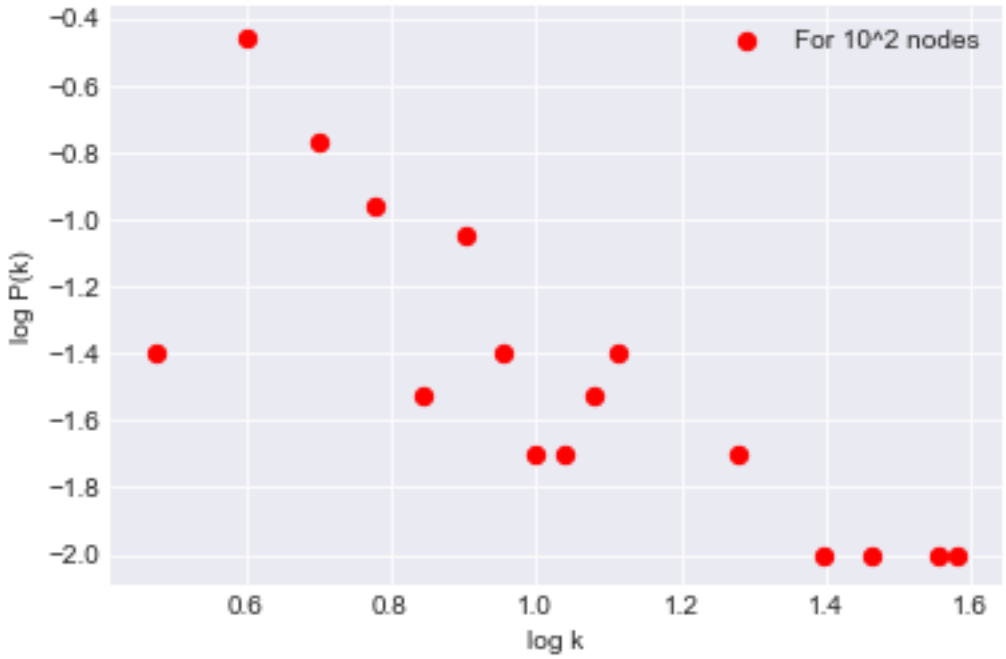

Fig: Degree distribution for the network with 10^2 nodes

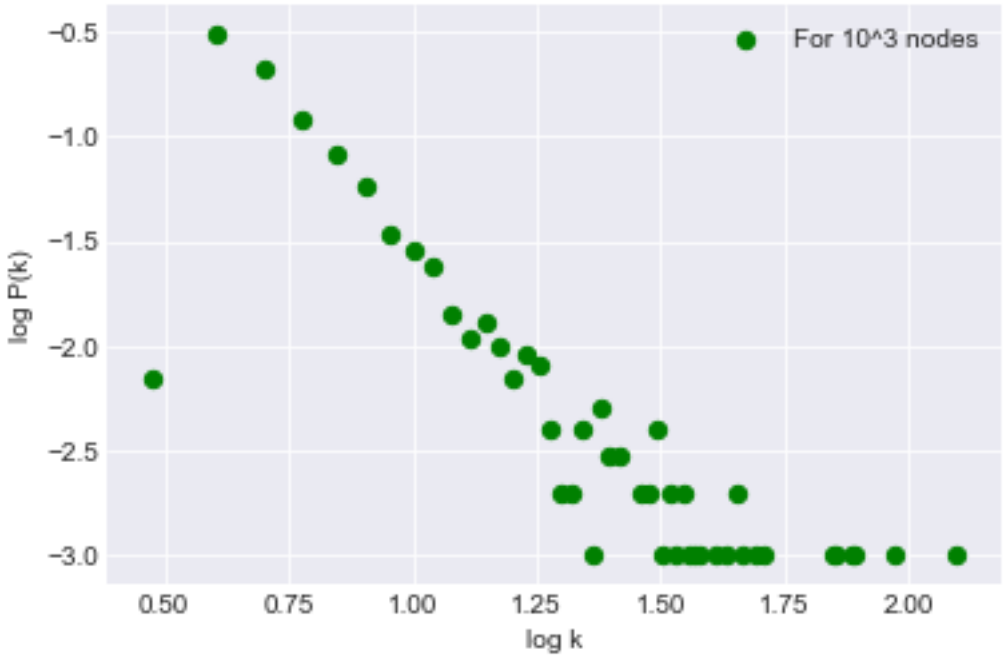

Fig: Degree distribution for the network with 10^3 nodes

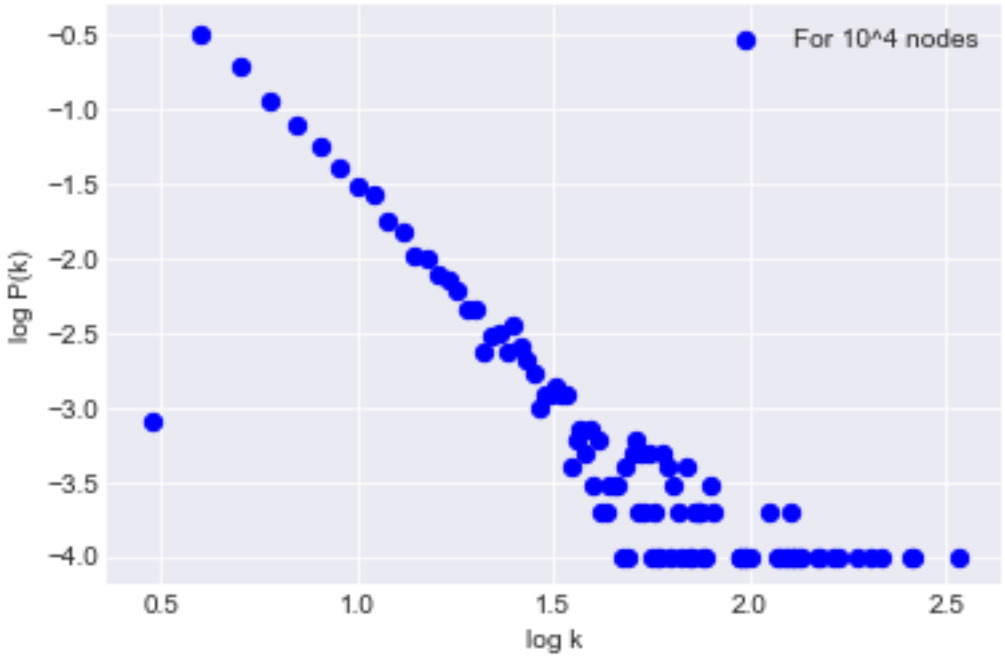

Fig: Degree distribution for the network with 10^4 nodes

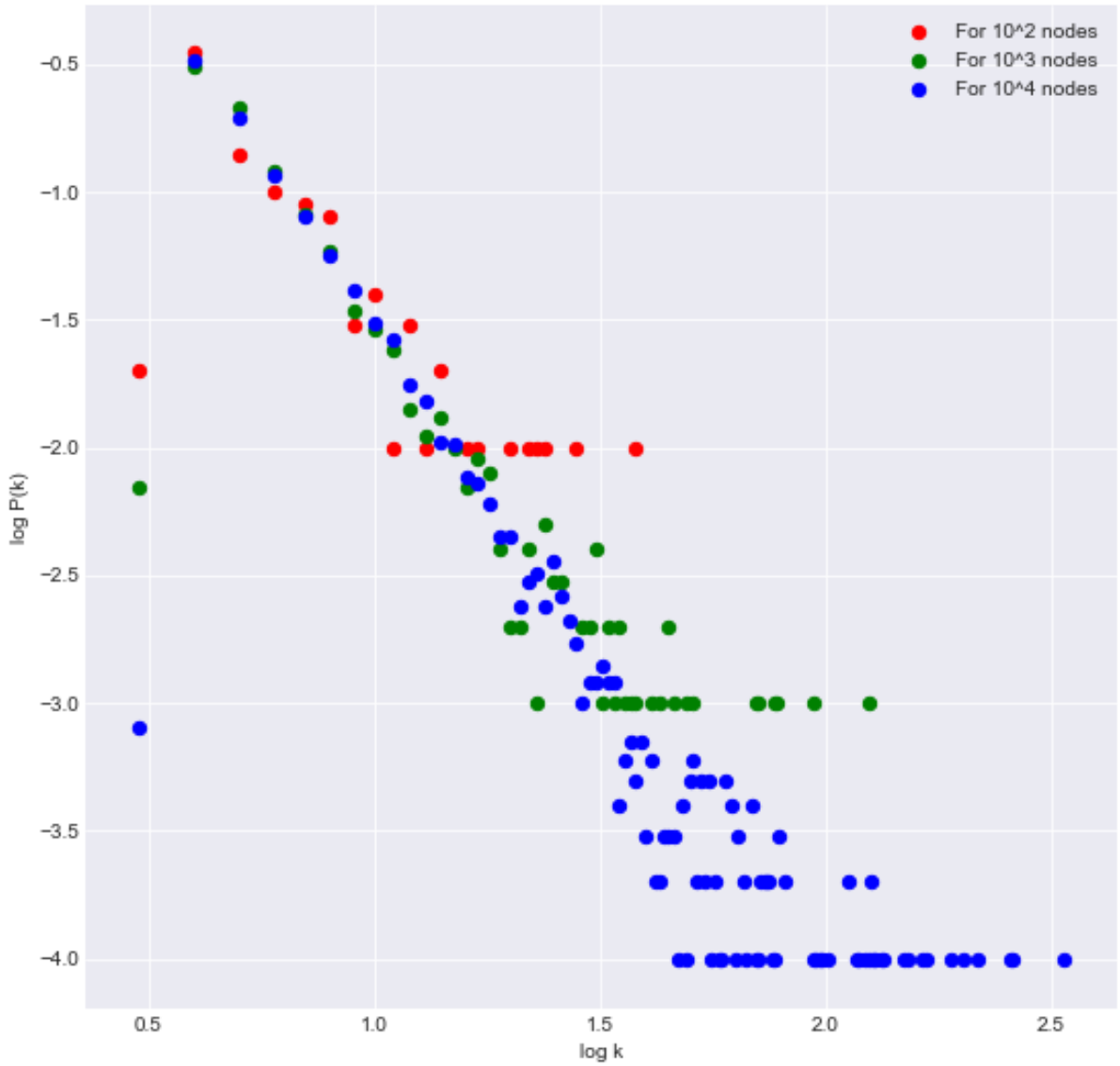

Fig: Degree distribution for the network plotted together for 3 different total count of nodes in the network

c.)

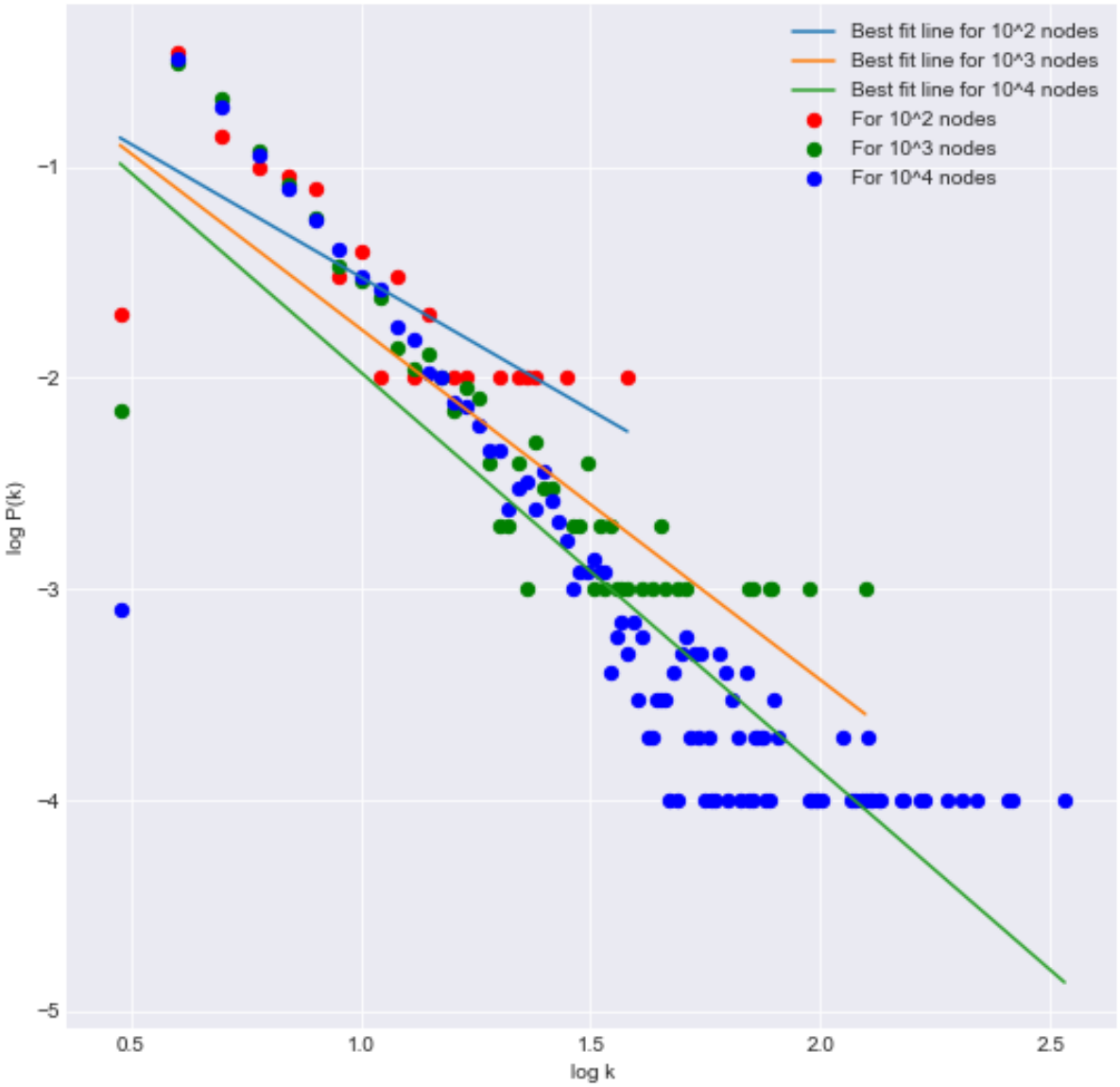

Fig: Degree distribution for the network along with the best fit lines for 3 different count of total nodes in network

Gamma value for power law with 10^2 nodes = 1.262341697529604
Gamma value for power law with 10^3 nodes = 1.6652121670368711
Gamma value for power law with 10^4 nodes = 1.8917609337148602

d.)

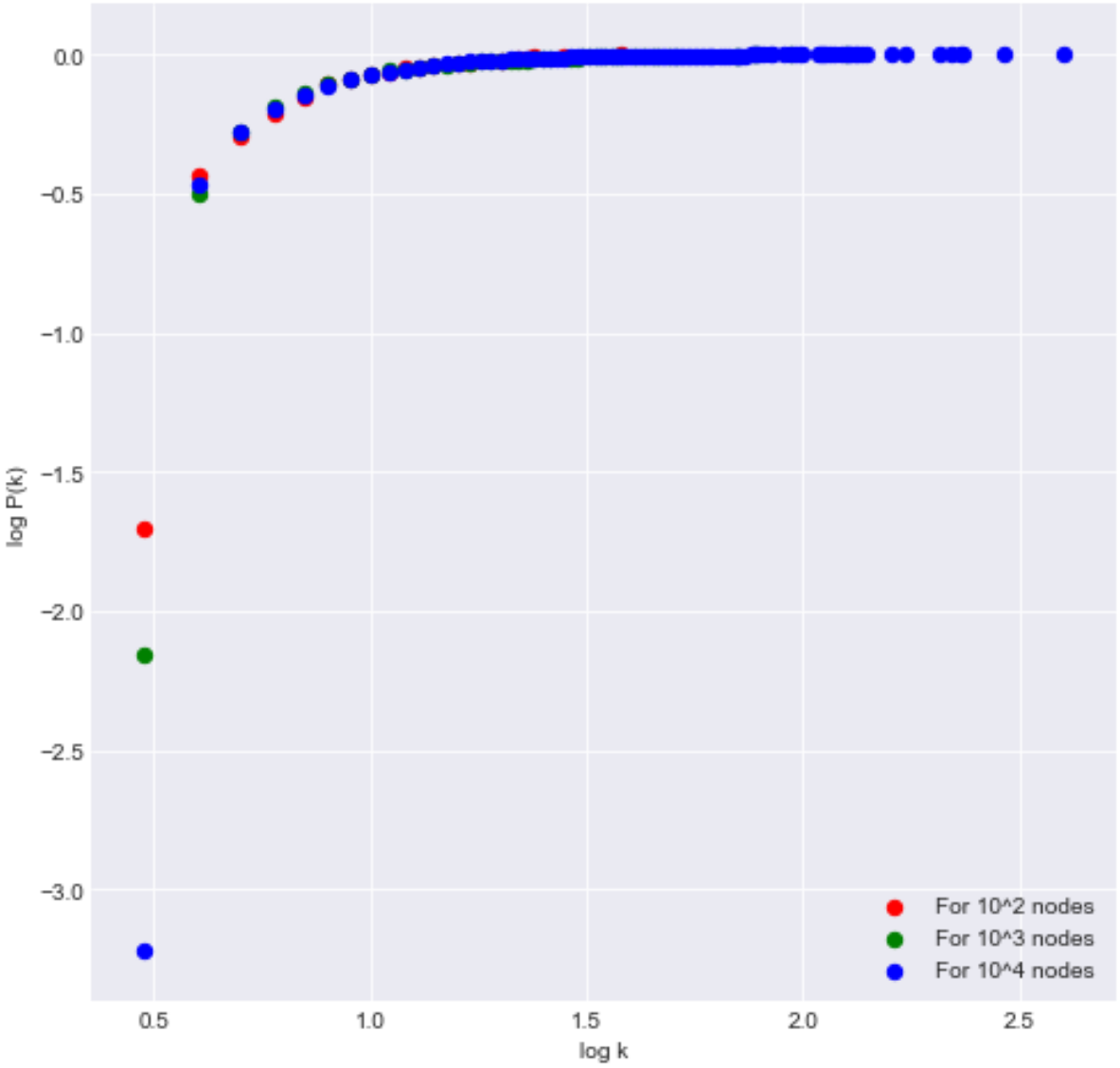

Fig: Cumulative degree distribution for the network at 3 different times

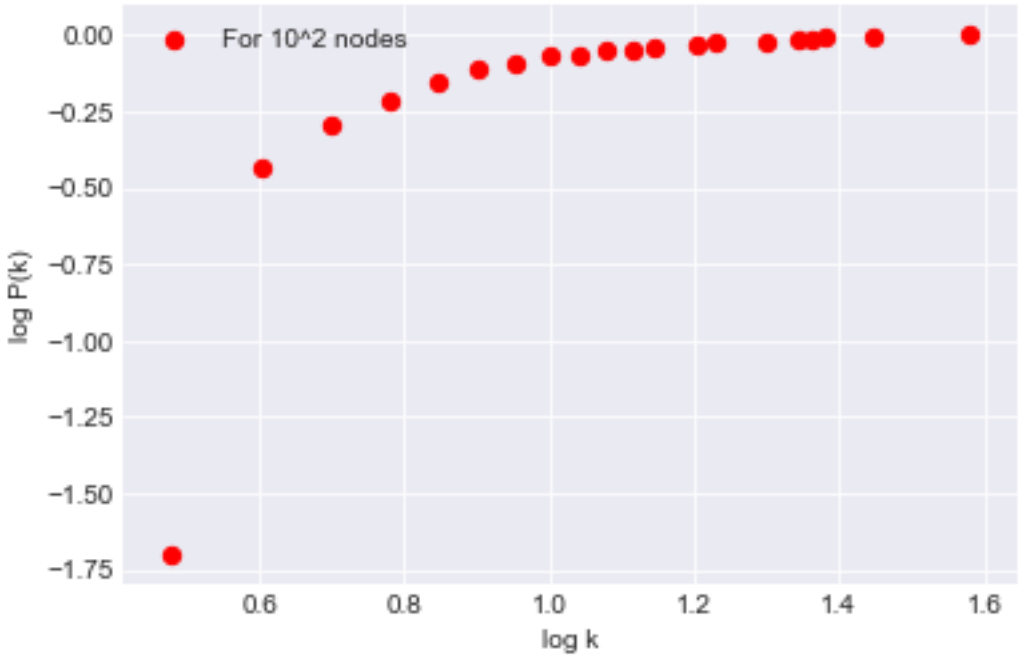

Fig: Cumulative degree distribution for network with 10^2 nodes

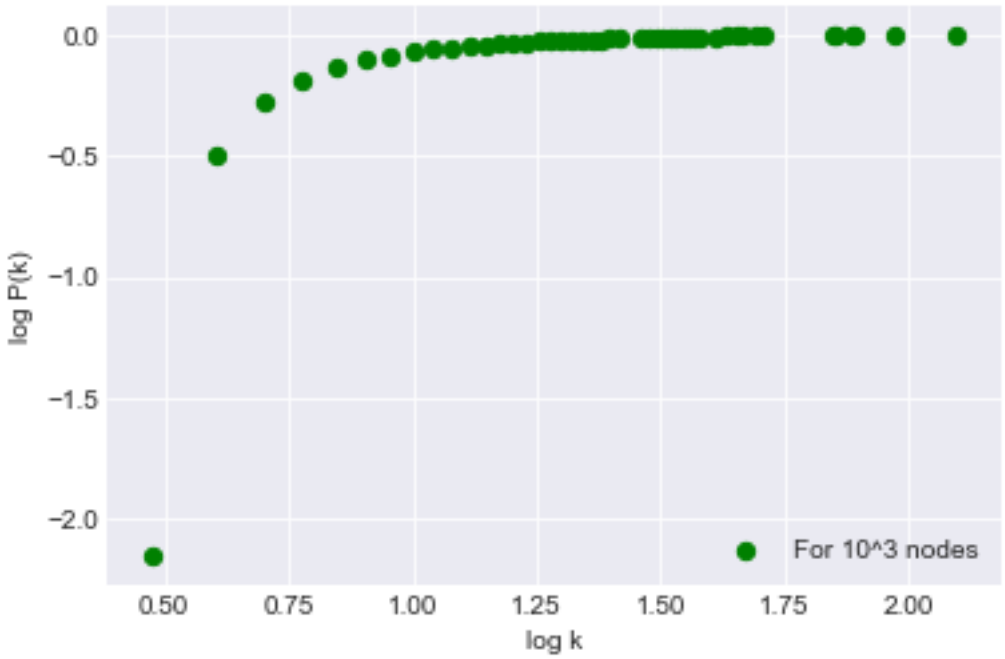

Fig: Cumulative degree distribution for network with 10^3 nodes

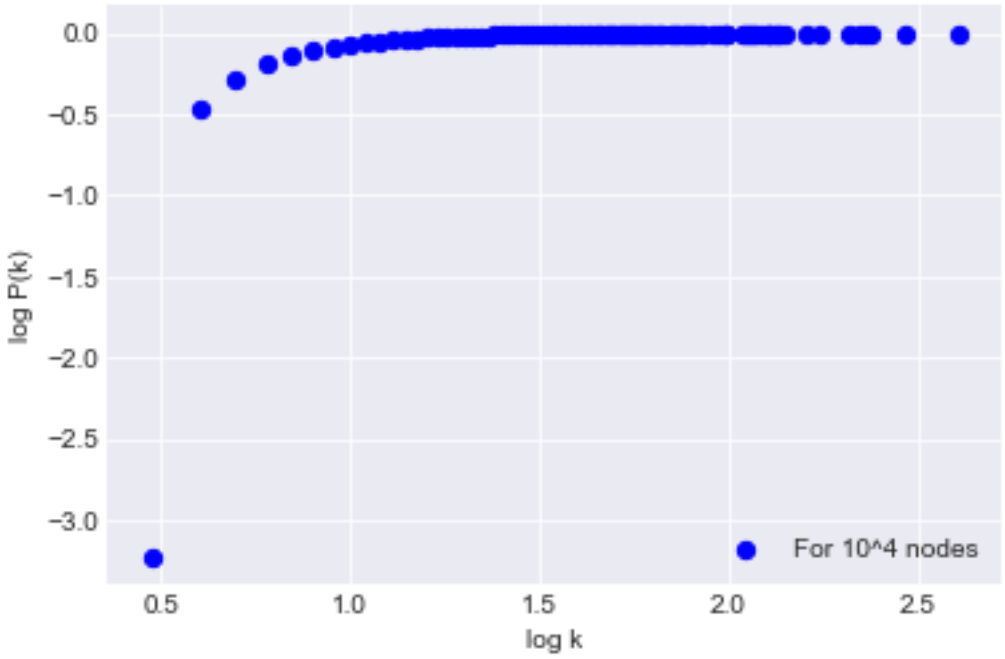

Fig: Cumulative degree distribution for network with 10^4 nodes

e.)

average clustering coefficient for the graph with 10^2 nodes = 0.18020163656433003

average clustering coefficient for the graph with 10^3 nodes = 0.033514218122254885

average clustering coefficient for the graph with 10^4 nodes = 0.006422412733611565

f.

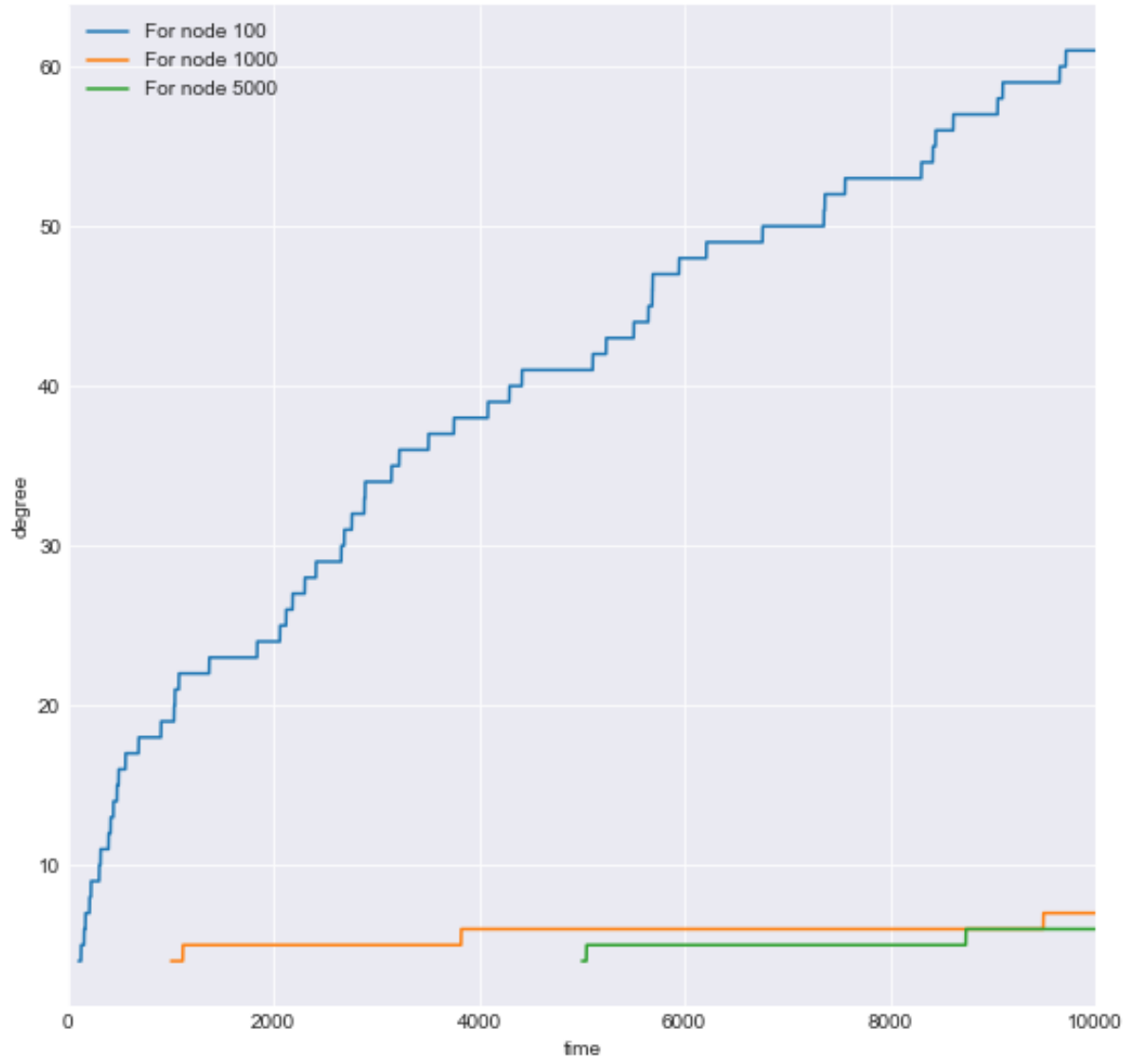

Fig: The growth of degrees of the nodes with time

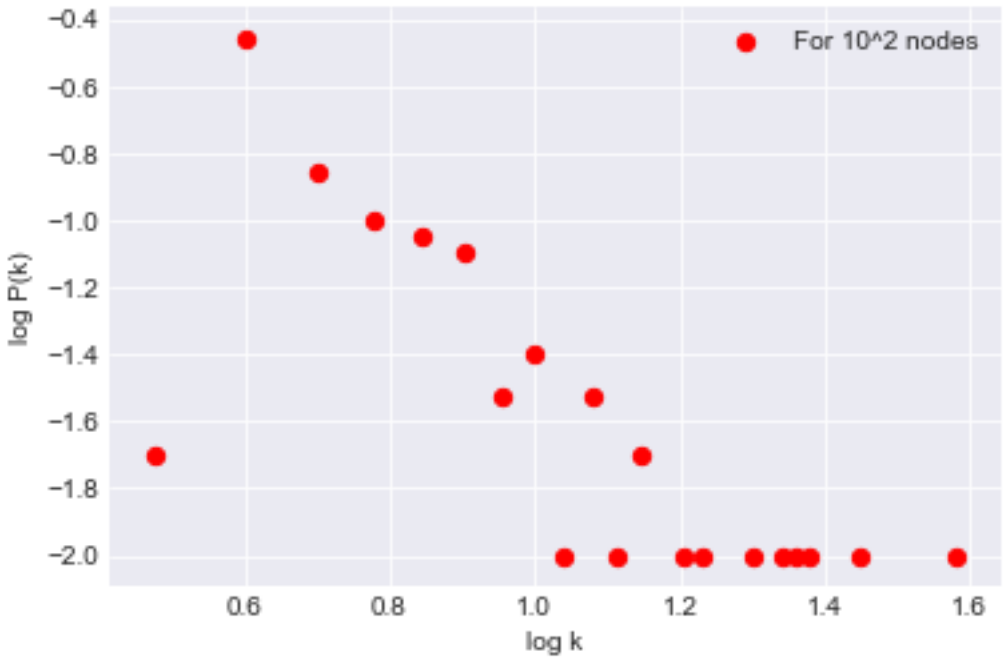

Fig: Degree distribution for the network with 10^2 nodes

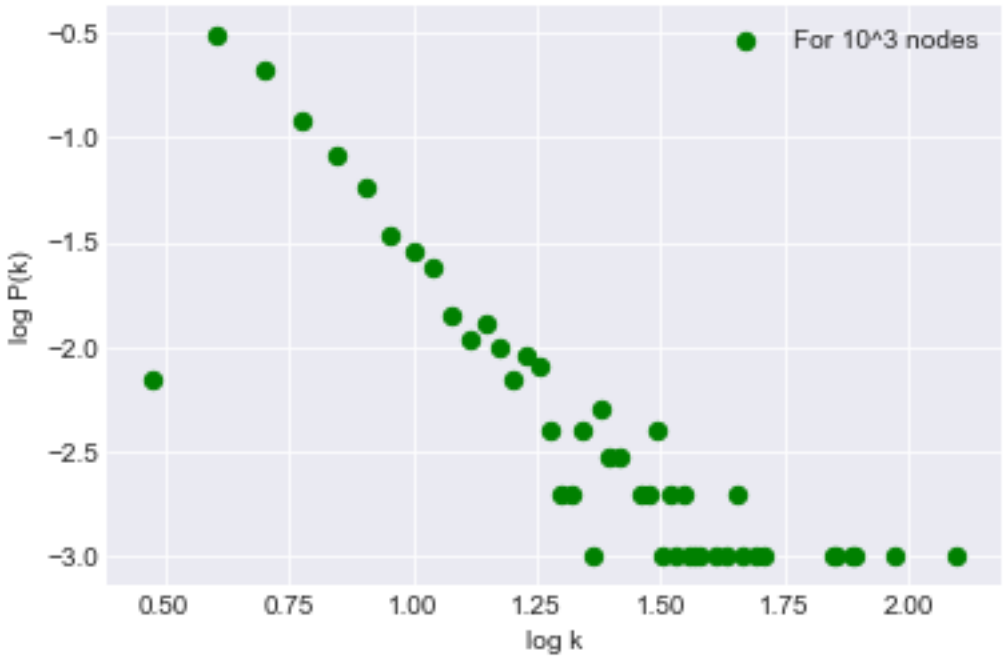

Fig: Degree distribution for the network with 10^3 nodes

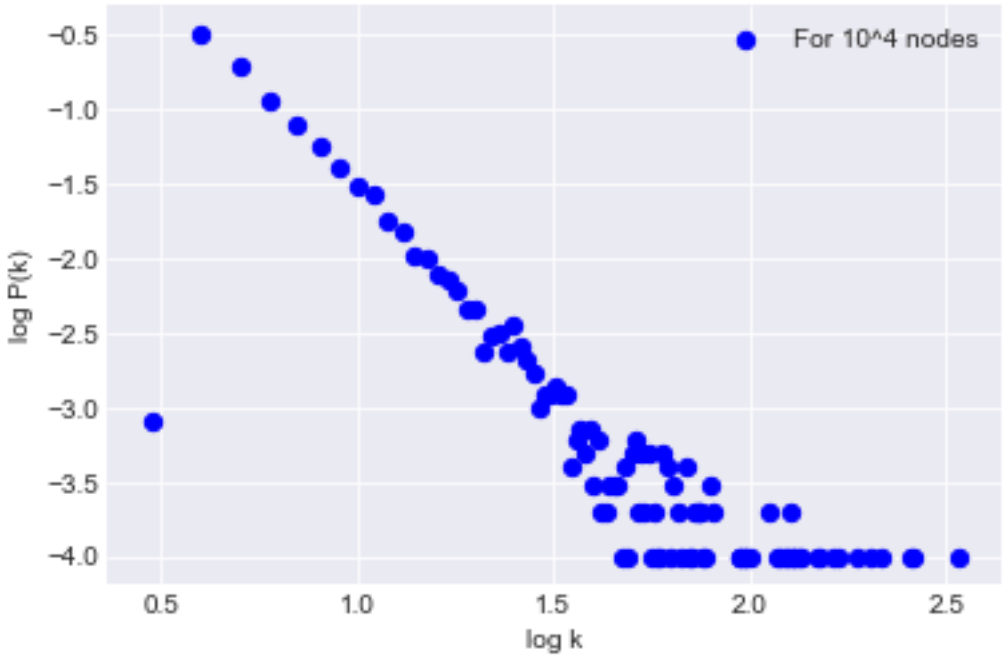

Fig: Degree distribution for the network with 10^4 nodes

Question 2:

The 5 nodes with highest page ranks are:
20
38
37
72
35
The 5 nodes with lowest page ranks are:
1
65
23
22
53