Activity 5

Lucas Guesser Targino da Silva - RA: 203534

September 26, 2022

1   Problem Description

Two undirected networks are given in the `data/` directory of the project. For them:

1. Plot their degree distributions in log-log scale

2. Answer: which of the two is more likely to be a scale-free network?

2   Result

As stated in Barabasi's book, Chapter 4 on Scale-Free Property, the degree distribution of Scale-Free Networks follow the Power Law given by $p_k = C \cdot k^{-\gamma}$.

Comparing the Figures 1 and 2, one notices that the network of the *net1* data set fits better the give Scale-Free Network model. Therefore, *net1* is more likely to be a Scale-Free Network than *net2*.
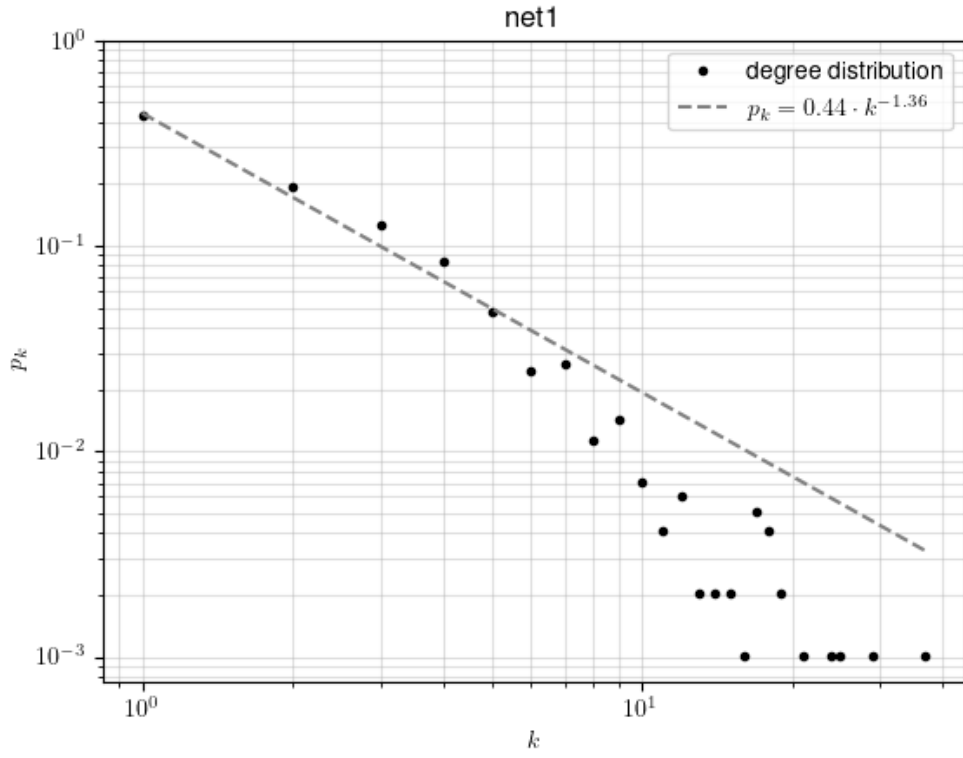
Figure 1: degree distributions in log-log scale of the *net1* graph. The black points are the data extracted from the graph. The gray dashed line is the curve fit of a power law function $p_k = C \cdot k^{-\gamma}$.
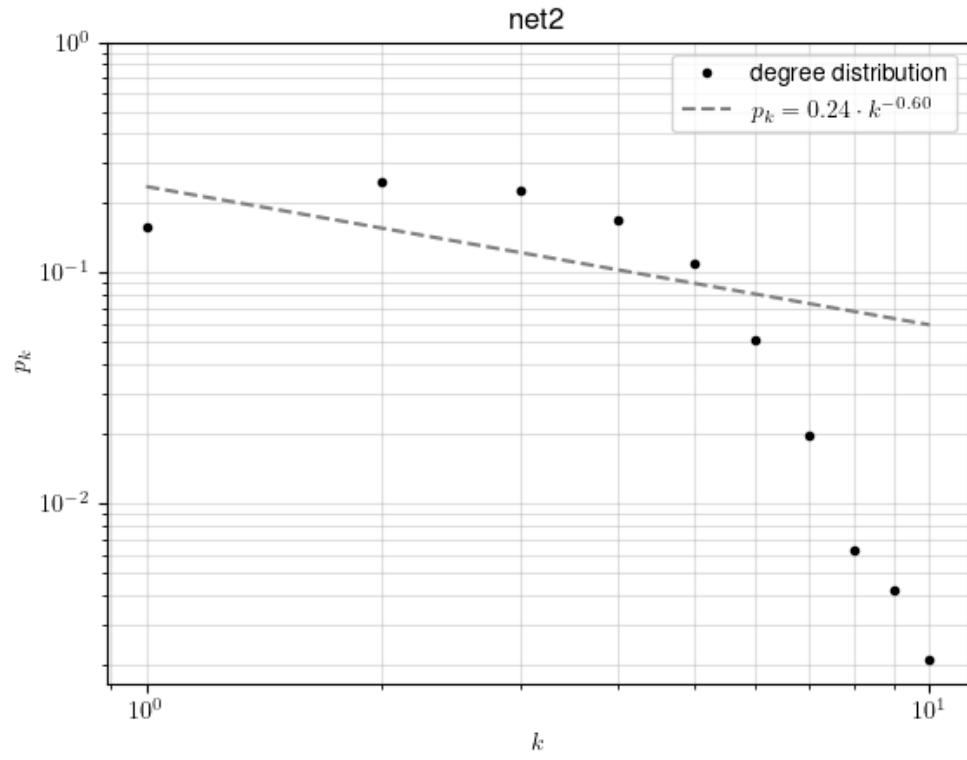
Figure 2: degree distributions in log-log scale of the *net2* graph. The black points are the data extracted from the graph. The gray dashed line is the curve fit of a power law function $p_k = C \cdot k^{-\gamma}$.