PAM

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Here we generated Preferential Attachment Models (PAMs) as defined in chapter 8 of RGCN volume 1.

From 8.4.11 en 8.4.12, we know degree distribution behaves like powerlaw with exponent $\tau = 3 + \frac{\delta}{m} > 2$.

The objective here is to inspect three different definitions for a degree distribution. The conventional definition, the size-biased definition (1.2.2 in RGCN I), and the random friend distribution (the degree distribution of a uniformly selected adjacent vertex to a uniformly selected vertex in the network).

The plots below are for two generated graphs. One with parameters $\delta = -1, m = 2 \implies \tau = 2.5$, the other with parameters $\delta = 1, m = 2 \implies \tau = 3.5$. Both with $n = 10000$.

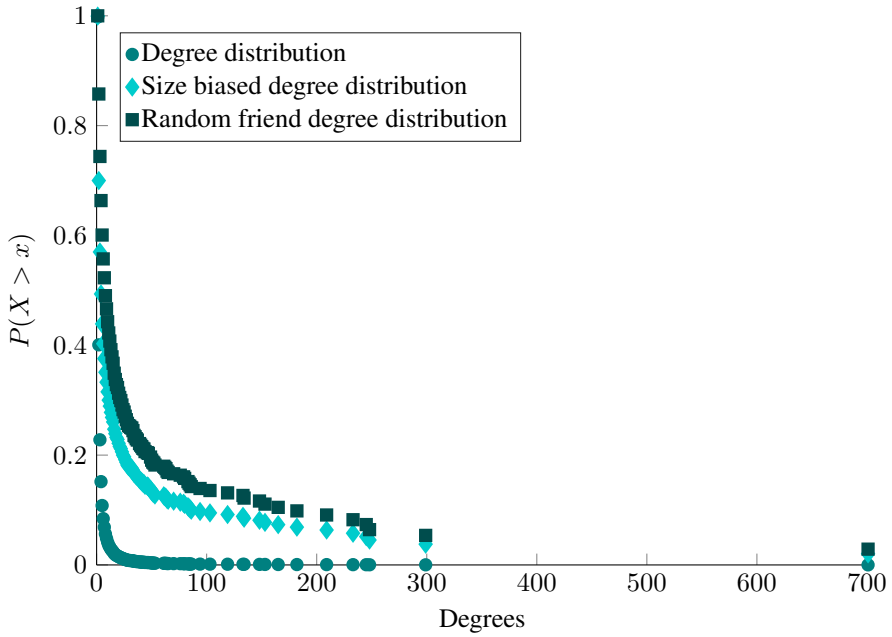

Figure 1: Degree distribution tau2,5

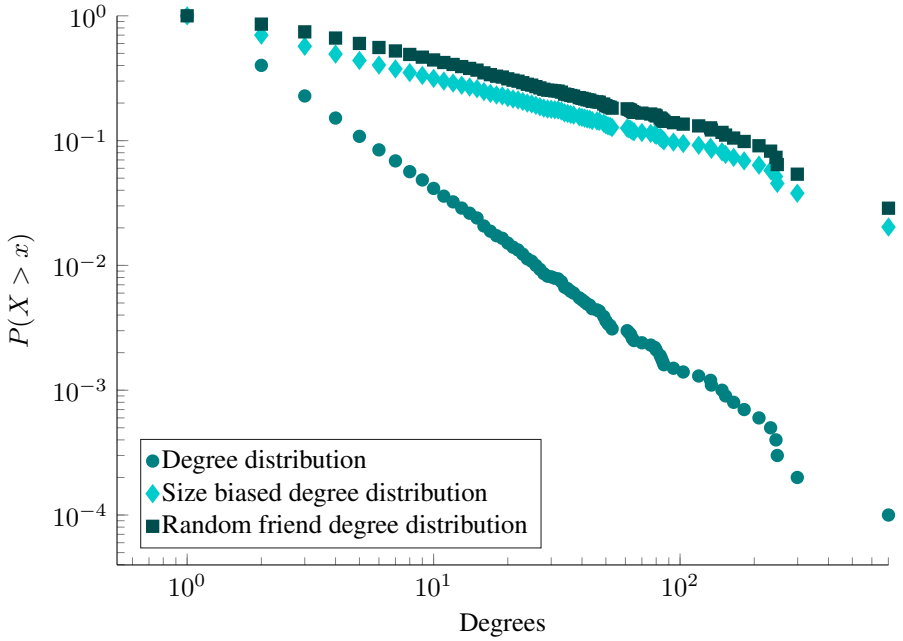

Figure 2: degree_distribution tau2,5 loglog.tikz

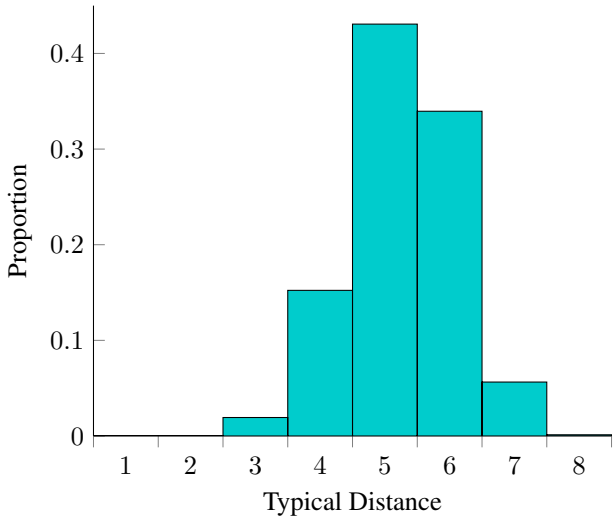

Figure 3: typical tau2,5 distance

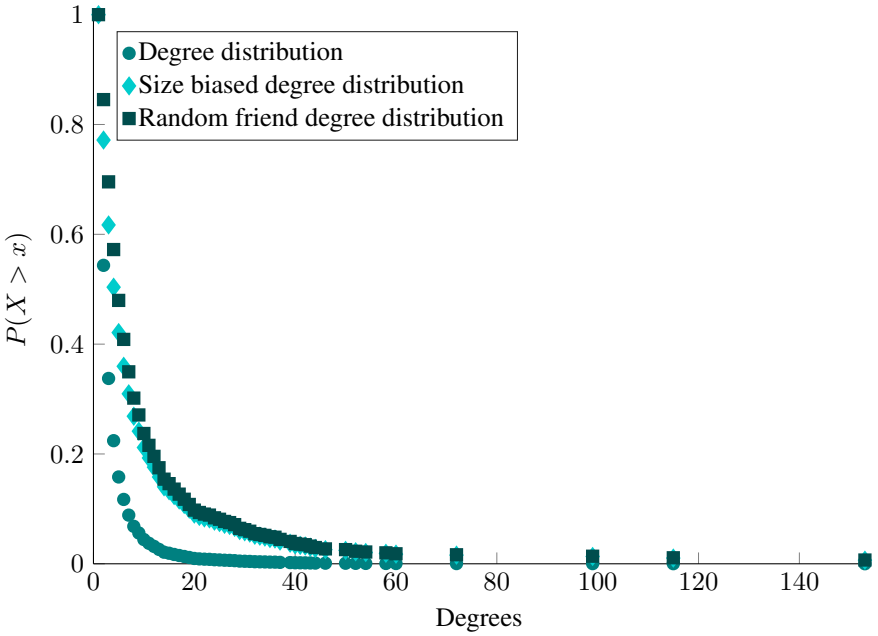

Figure 4: Degree distribution tau3,5

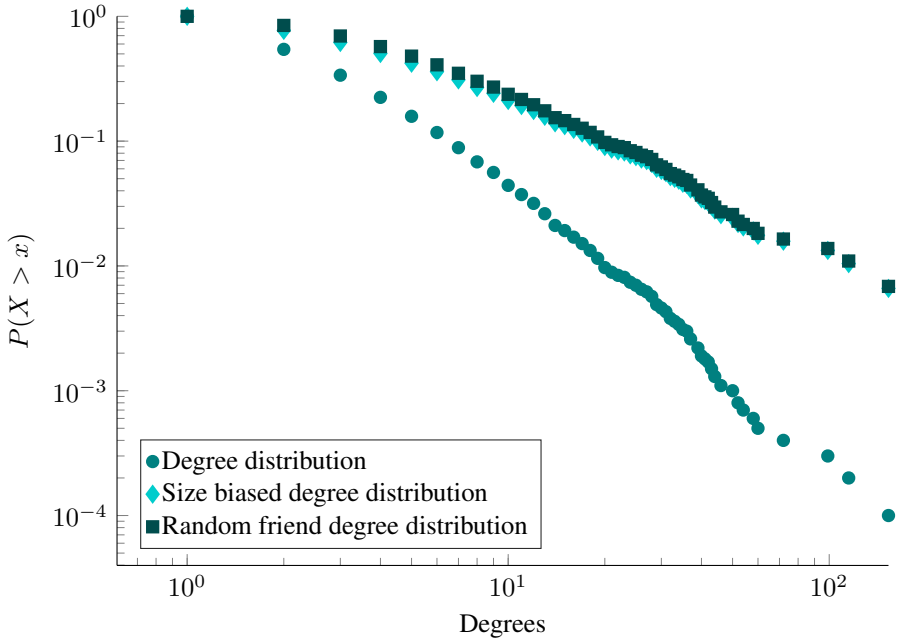

Figure 5: degree_distribution tau3,5 loglog.tikz

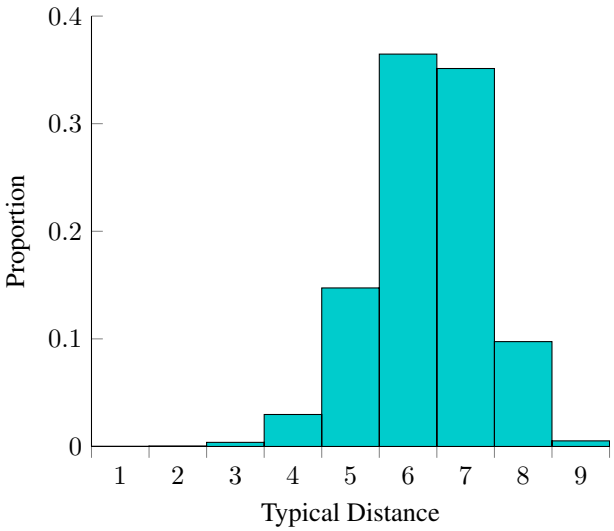

Figure 6: typical tau3,5 distance