Results from Erdős-Rényi initialization

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As recommended, we examined the behavior of the edge-reconnecting model when initialized with a complete graph. We would then predict that the "simplified edge density" and the "simplified self-loop density" would evolve quickly, on the n^2 scale, while the overall degree distribution remained approximately constant with most vertices retaining their initial degree of n. All of the following plots are from a realization of the system on $n = 200$ vertices with $\kappa = 1$.

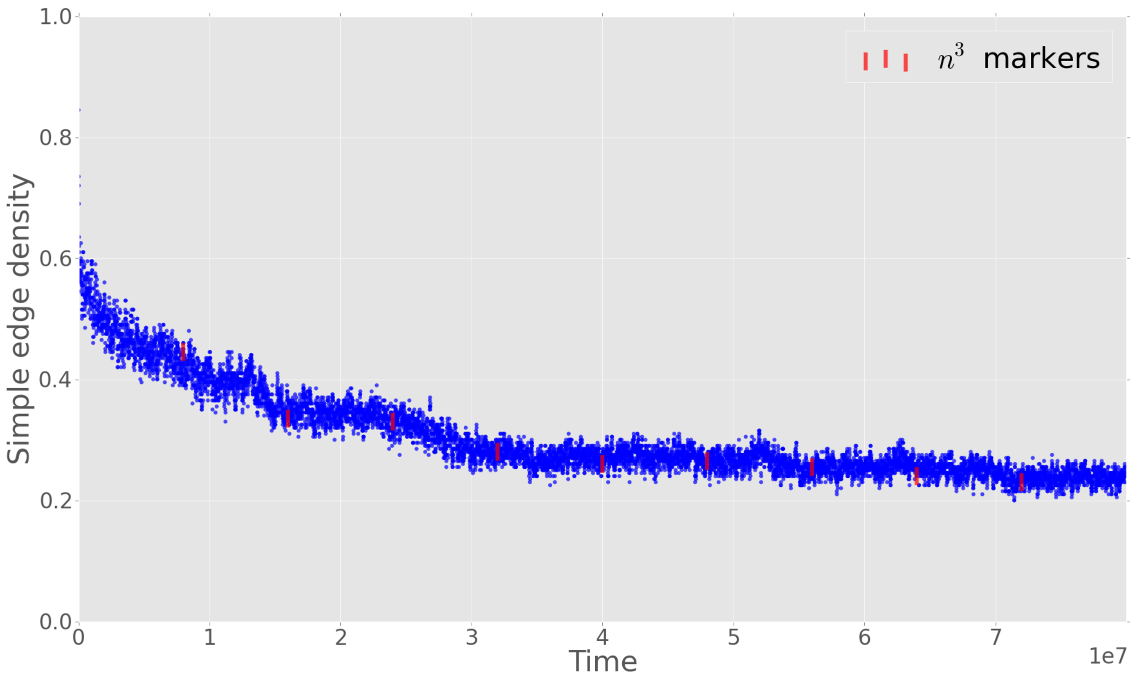

Figure 1: Evolution of the "simplified edge density", $\rho_{\text{simple}} = \frac{\#\text{connected vertex pairs}}{n^2}$. Red dashes mark out n^3 increments in time.

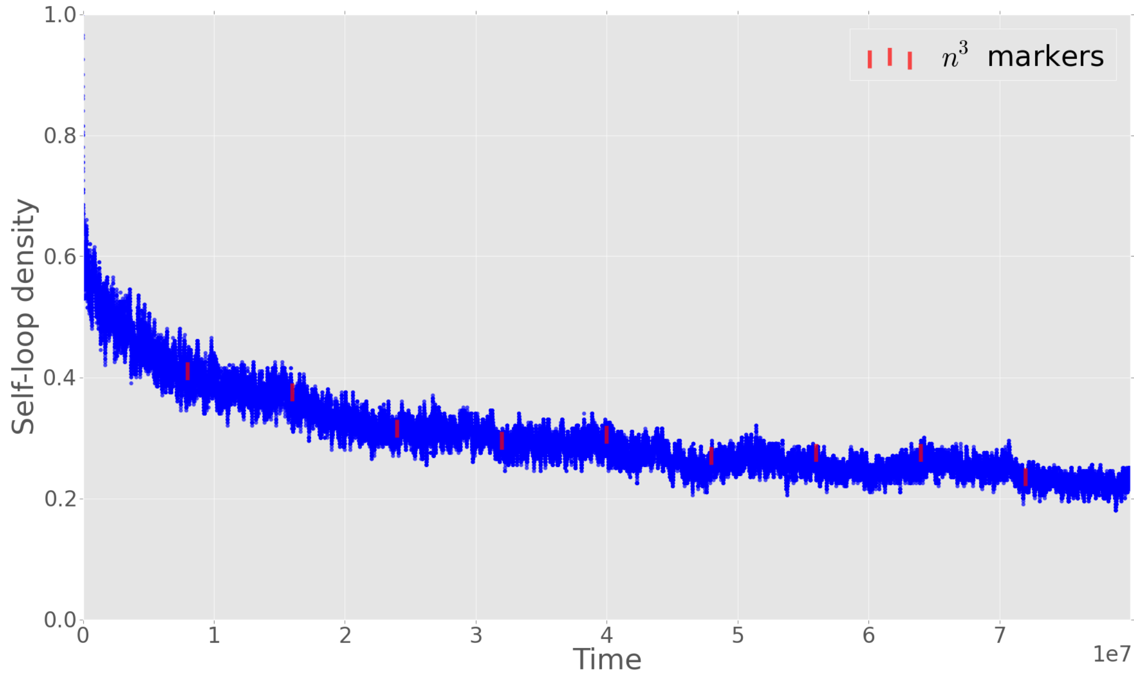

Figure 2: Evolution of the "simplified self-loop density", $\rho_{\text{self-loop}} = \frac{\#\text{vertices with self-loop}}{n}$. Red dashes mark out n^3 increments in time. As expected, this variable exhibits greater variability than the simplified edge density, as we average over only n values.

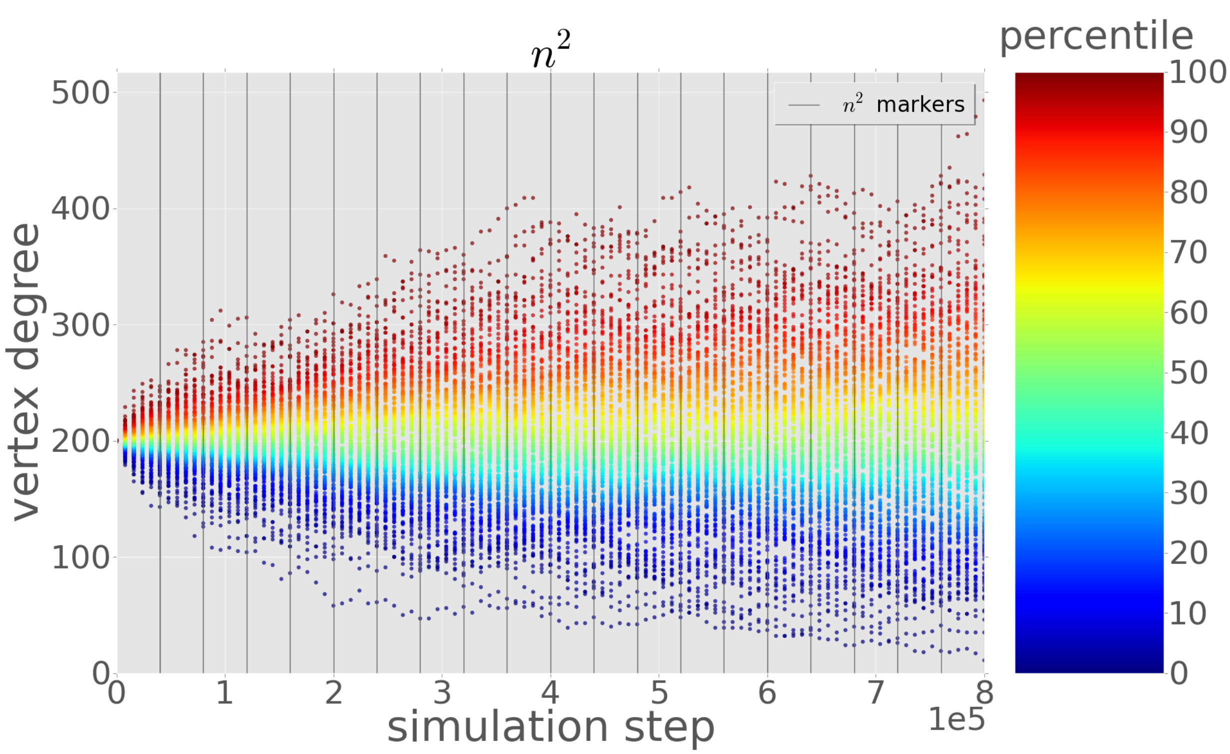

Figure 3: Evolution of degrees on the n^2 timescale. Vertical bars mark out n^2 increments in time. Qualitatively, the distribution appears near-constant within each n^2 slice.

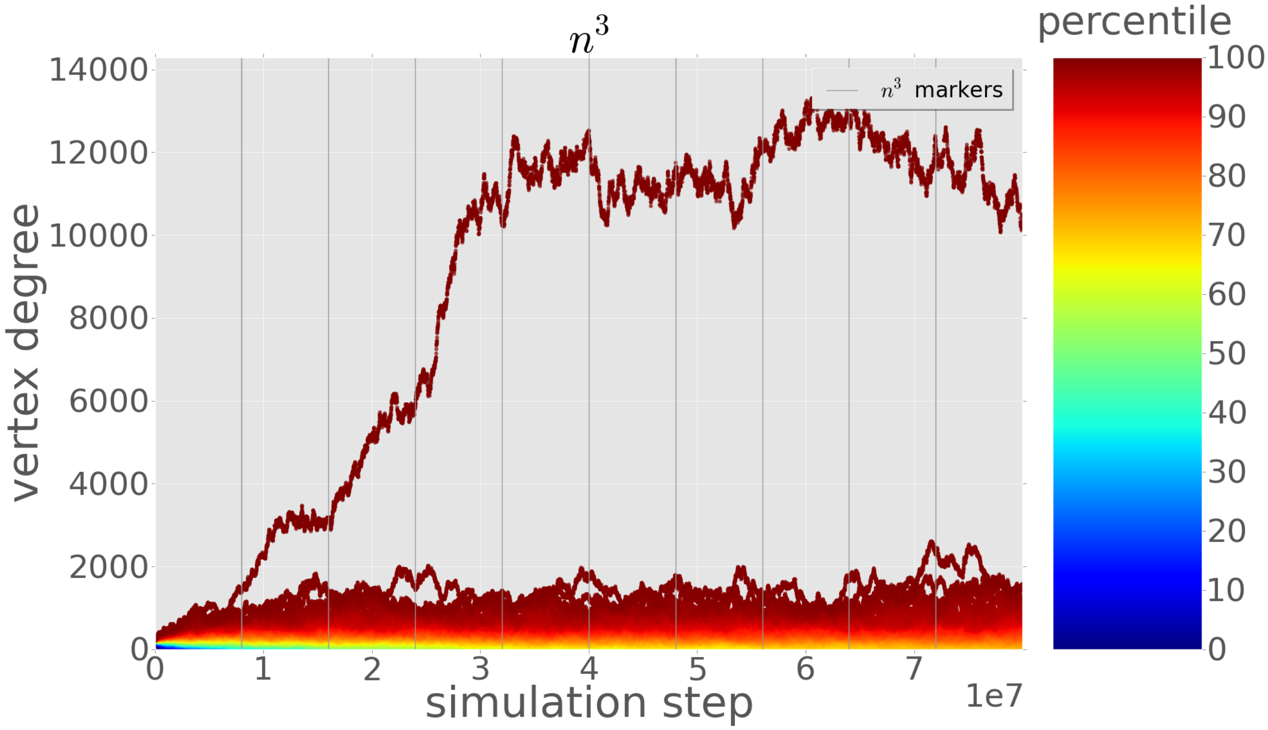

Figure 4: Evolution of degrees on the n^3 timescale. Vertical bars mark out n^3 increments in time. The lone outlying vertex with very high degree compresses the image and makes it difficult to visualize the evolution of the distribution, so the y-axis is truncated in the figure below. Thus, the only difference between this figure and the one below is the limits of the y-axis.

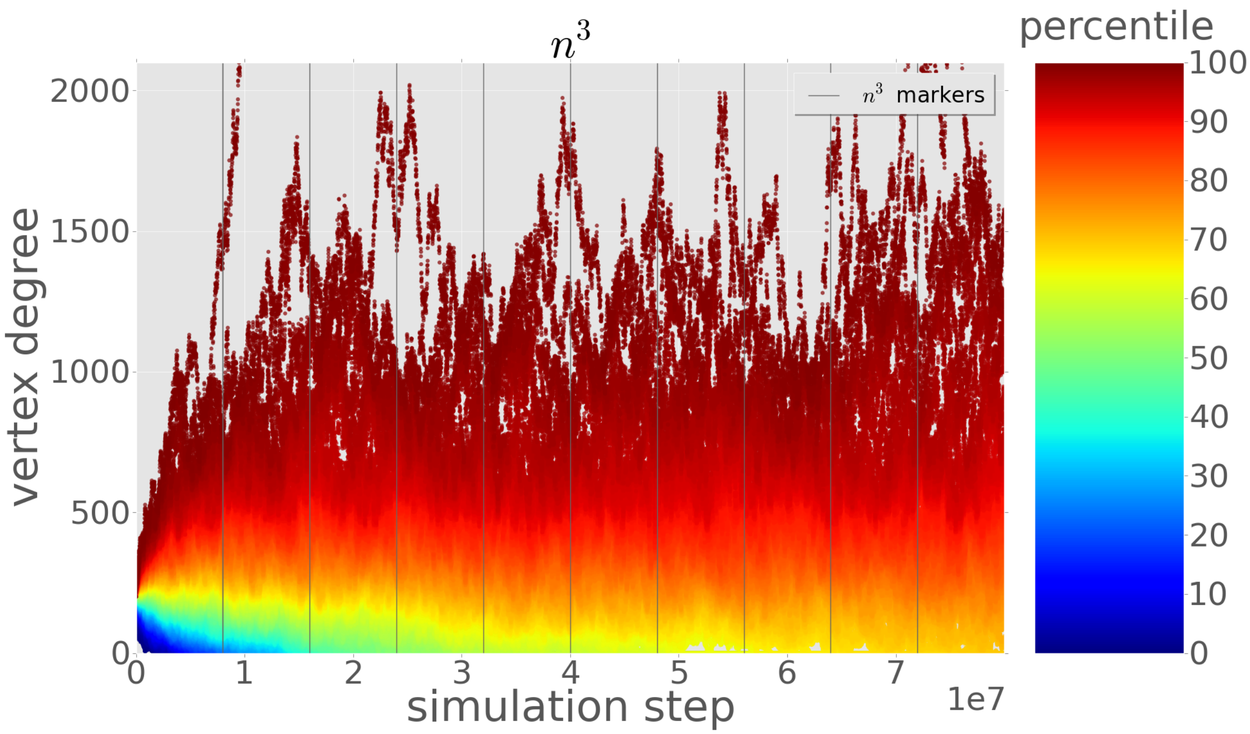

Figure 5: Evolution of degrees on the n^3 timescale. Vertical bars mark out n^3 increments in time. The stationary distribution, reached around step 5e7, is significantly different from that seen in the previous figure, on the initial n^2 scale.

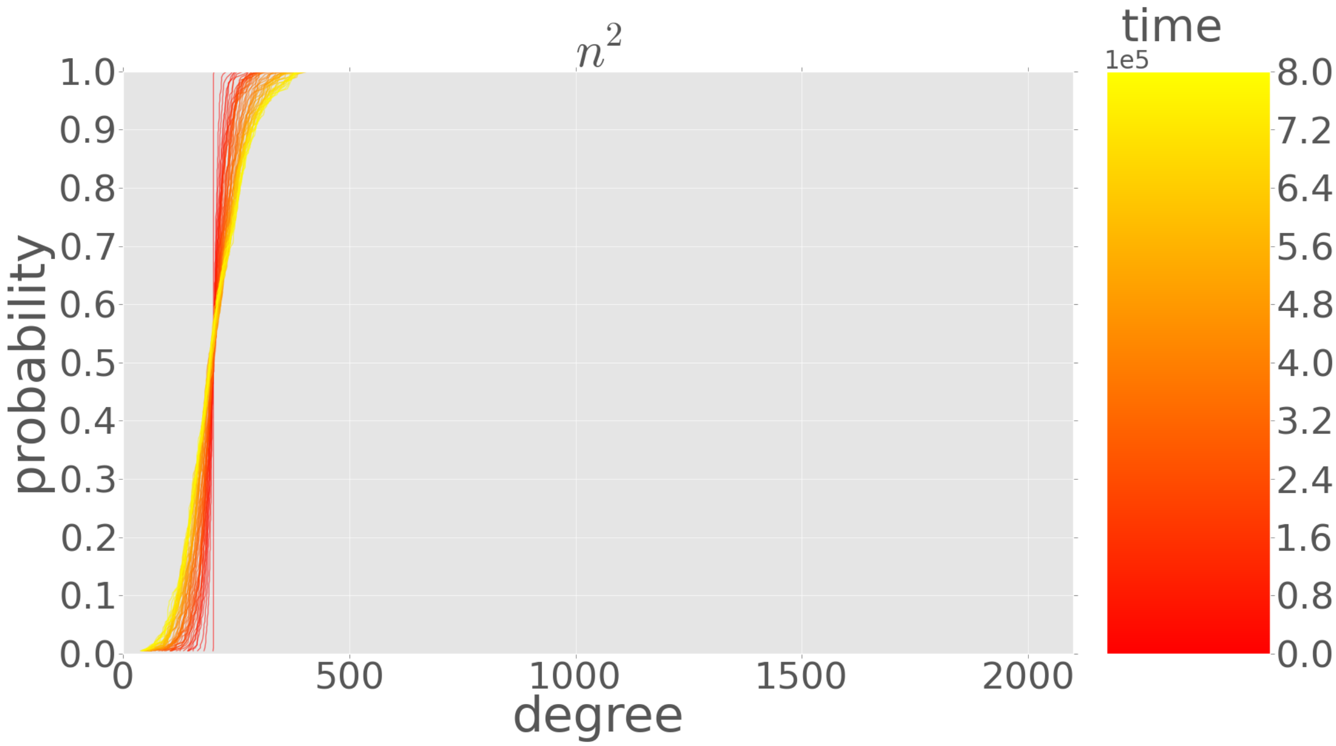

Figure 6: Evolution of the cdf of the degrees on the n^2 timescale. Distributions from earlier times are plotted in red, those from later in the simulation are in yellow. The final distribution was plotted after $20n^2 = 8e5$ steps.

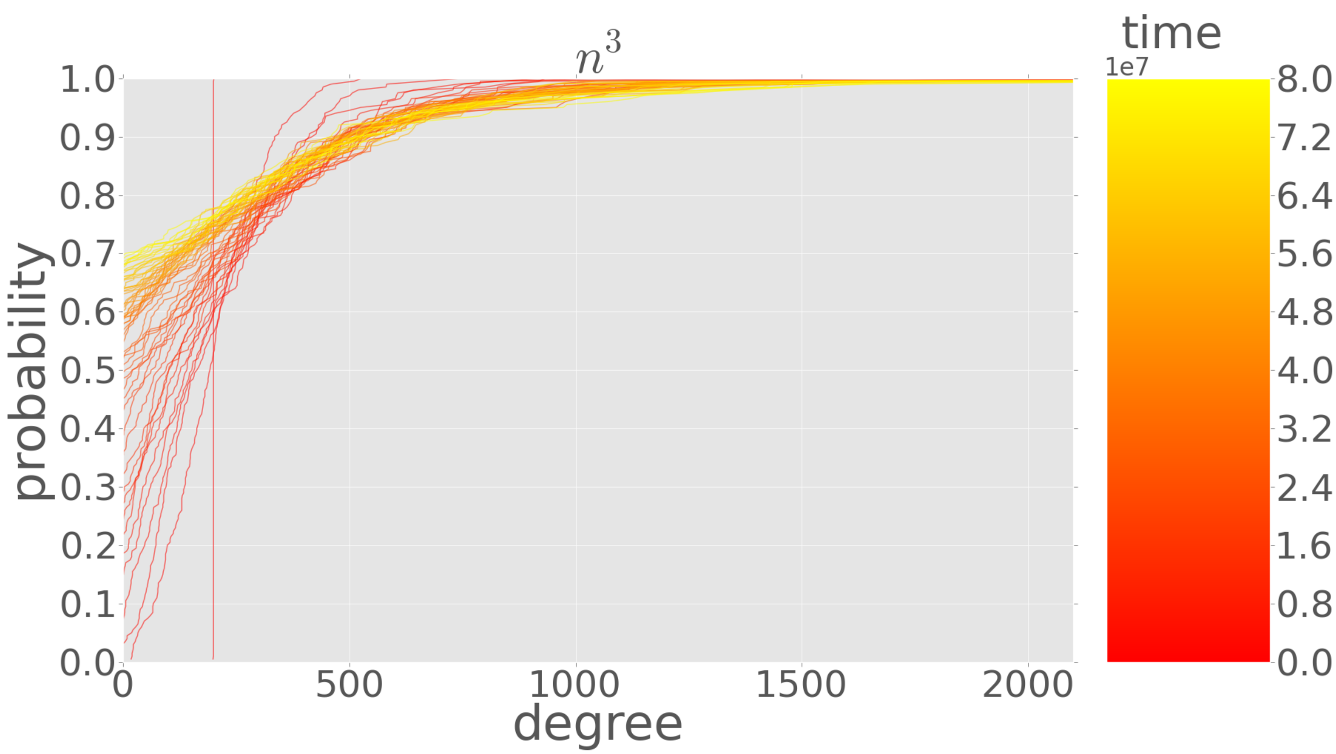

Figure 7: Evolution of the cdf of the degrees on the n^3 timescale. Distributions from earlier times are plotted in red, those from later in the simulation are in yellow. Here, the final distribution was plotted after $10n^3 = 8e7$ steps.