Project 3: Models of Growth and Aggregation (Cellular Automata)

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Dependence of P_∞ on Lattice Size

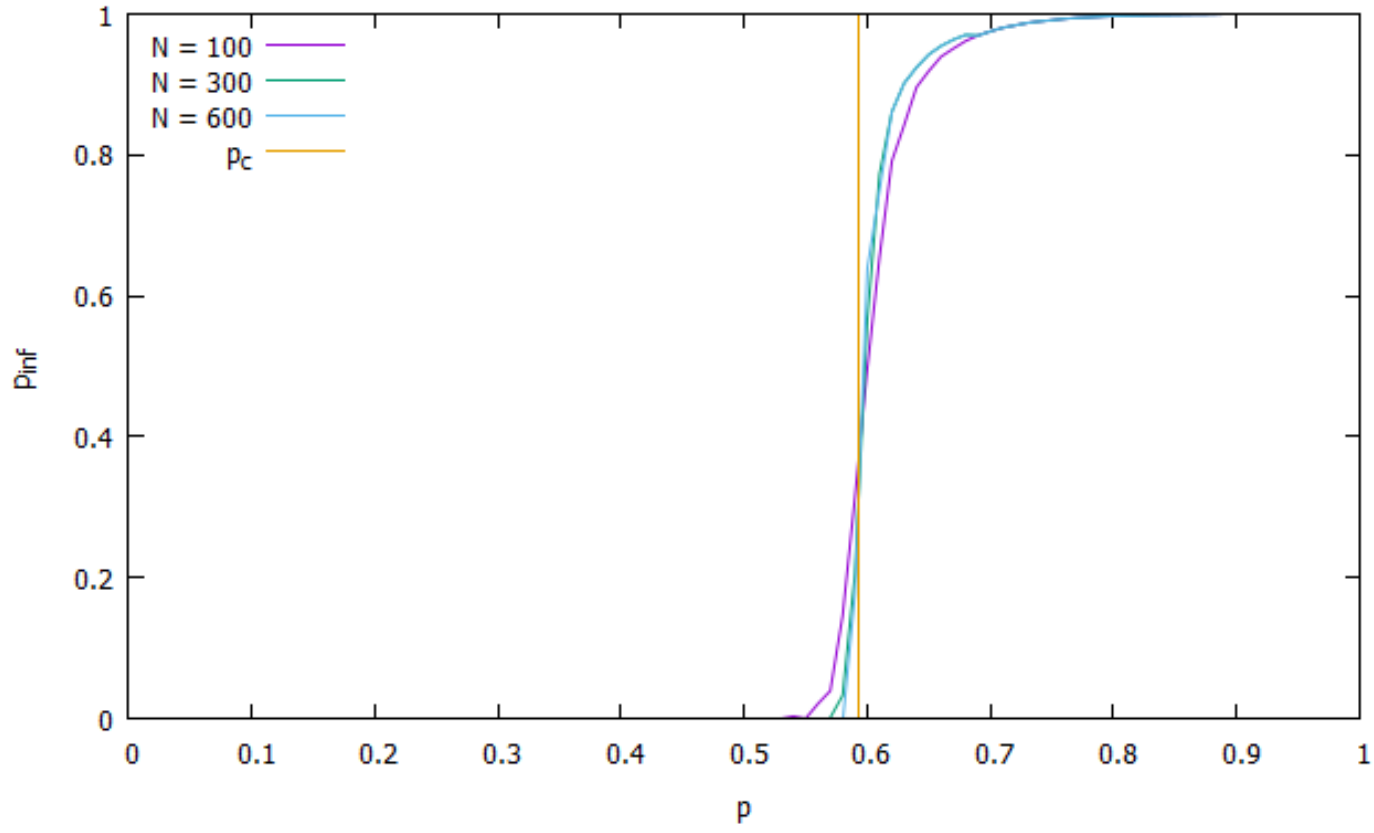

Figure 1: P_∞ as a function of P for three different cluster sizes.

Fractal Dimension Using Box Counting

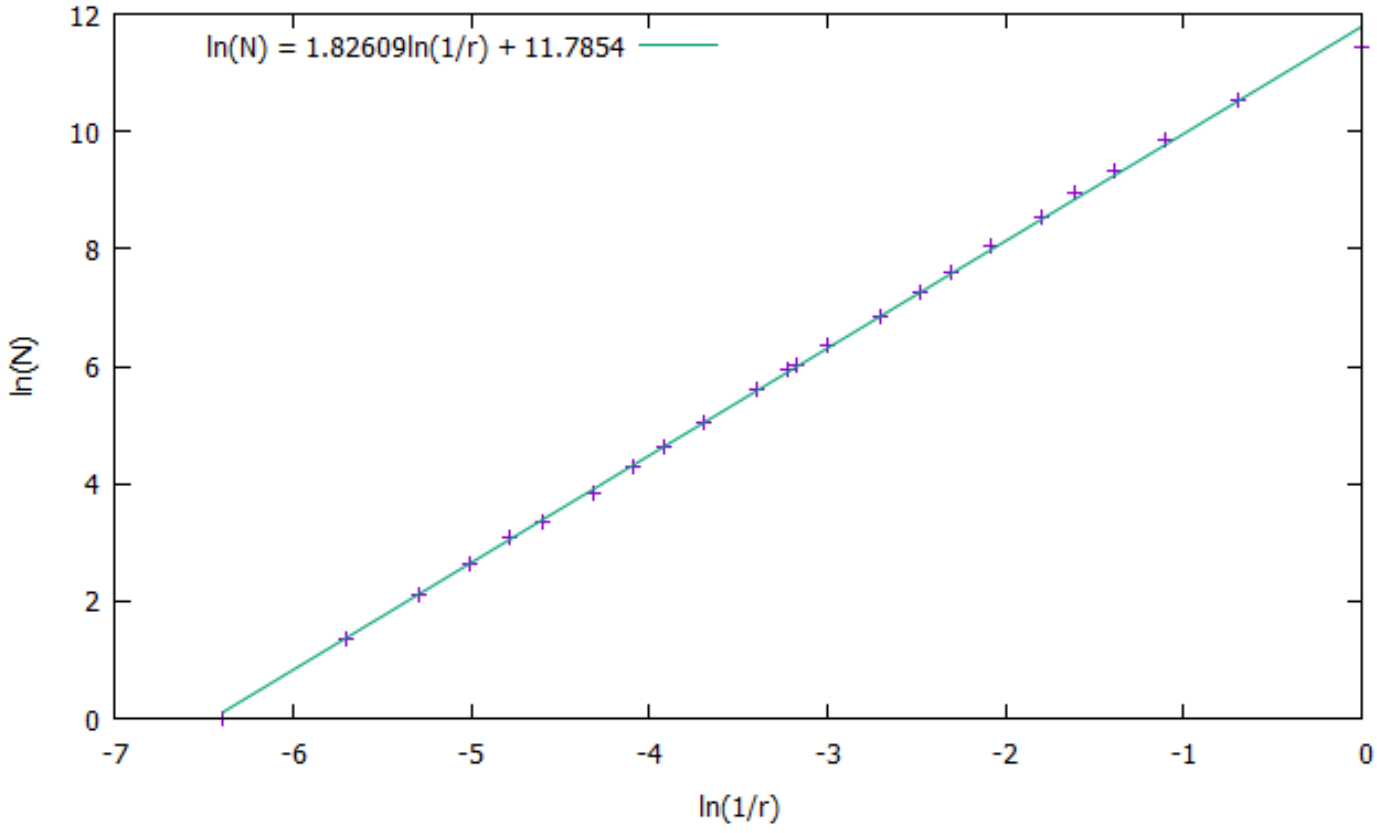

Figure 2: Log-log plot to determine the fractal dimension .

Anomolous Rate of Diffusion

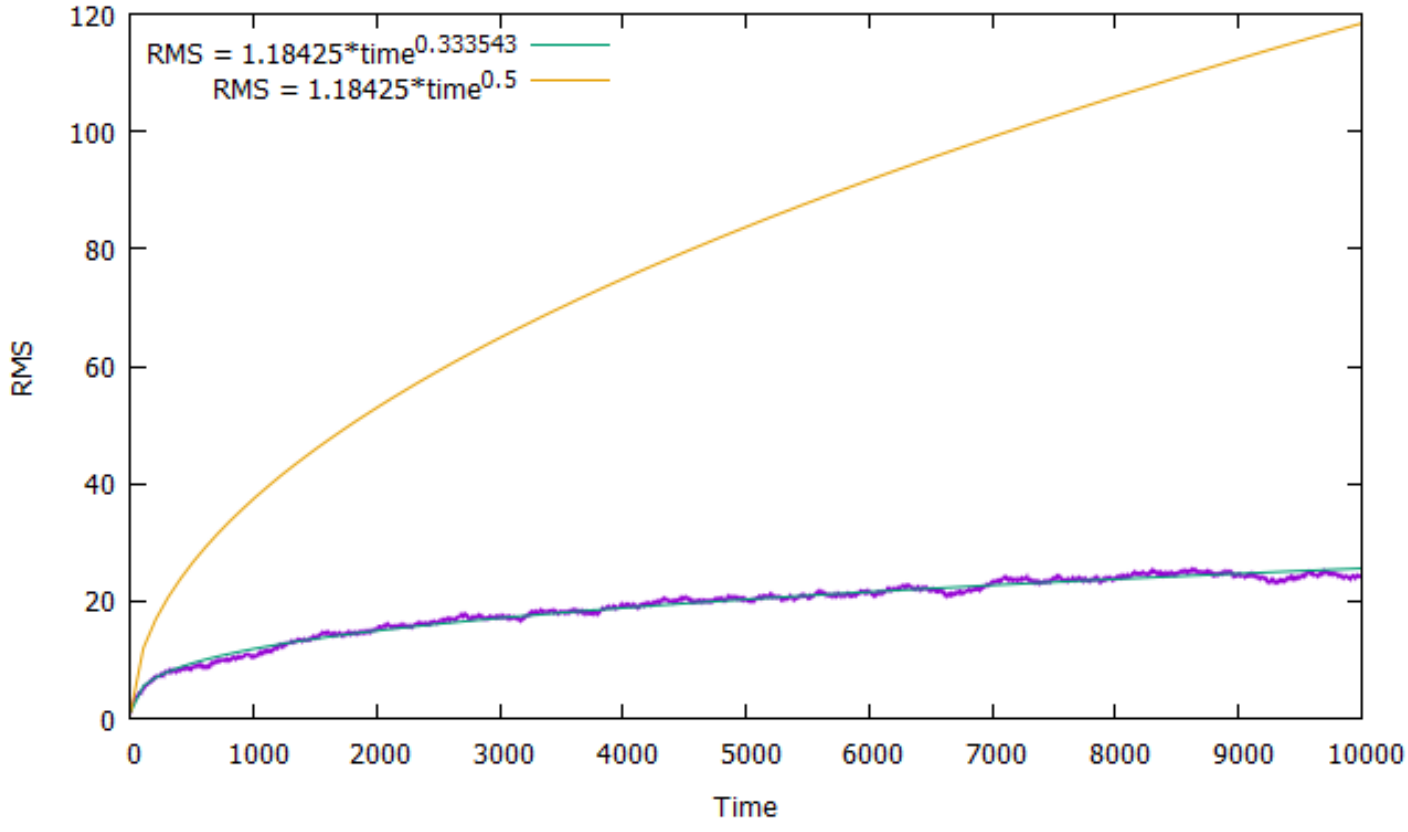

Figure 3: Root mean squared displacement as a function of time.

The Eden Growth Model

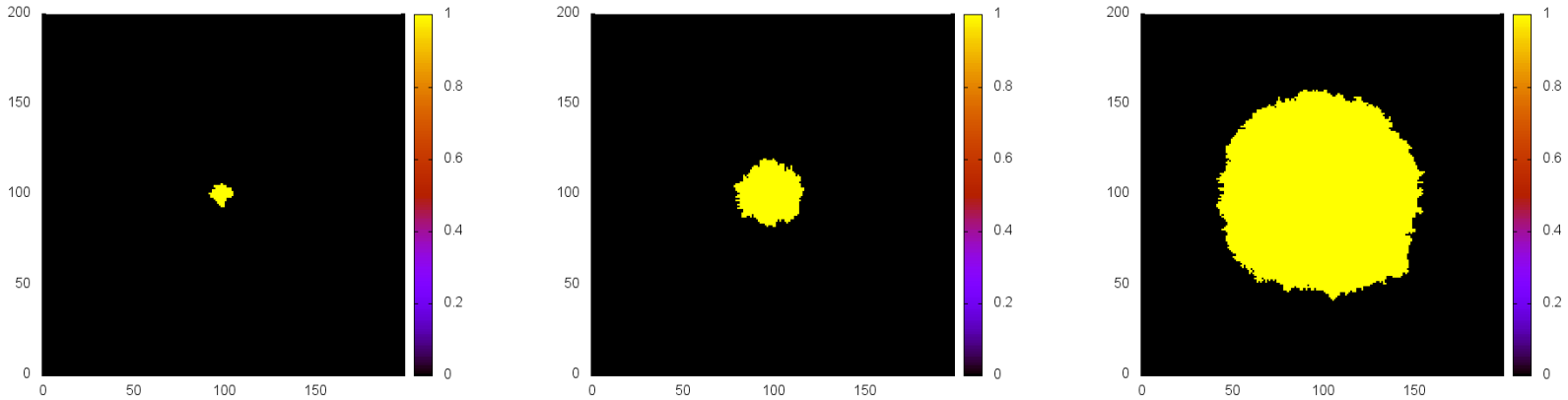

Figure 4: Cluster formed using the Eden Growth model at N=100, N=1000, and N=10000

The Eden Growth Model

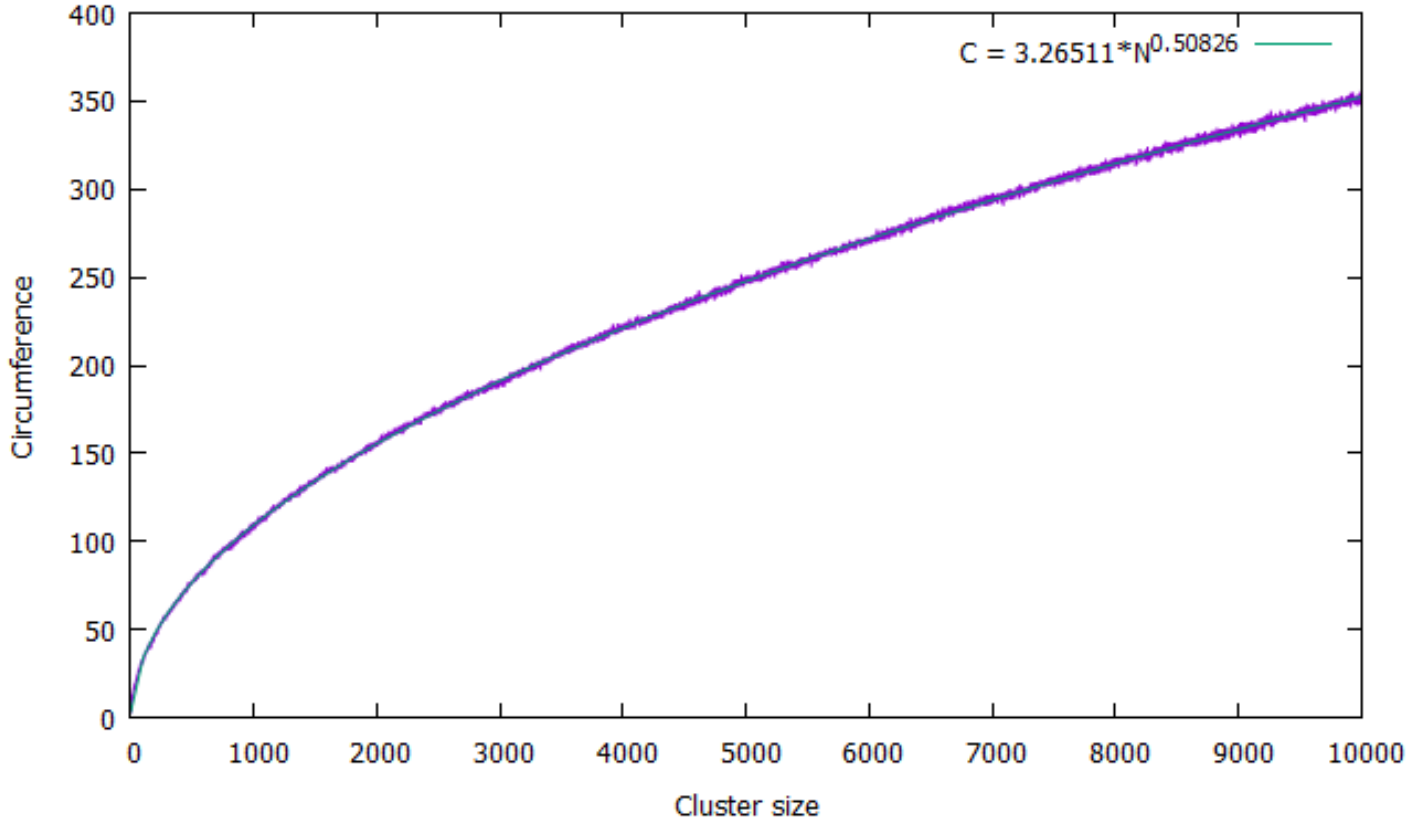

Figure 5: Circumference of the Eden cluster as a function of the cluster size.

The Eden Growth Model

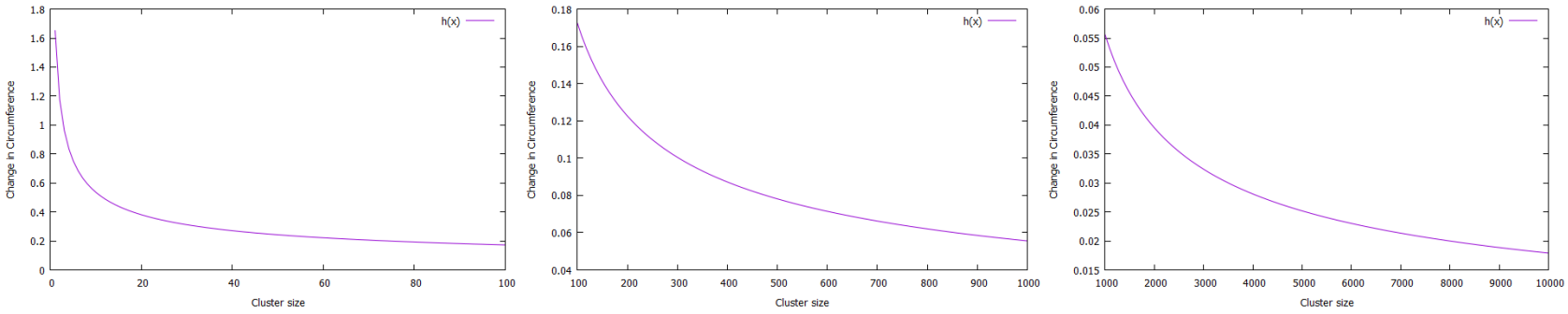

Figure 6: Rate of change of the circumference of the Eden cluster.

Epidemic Model for $p > p_c$

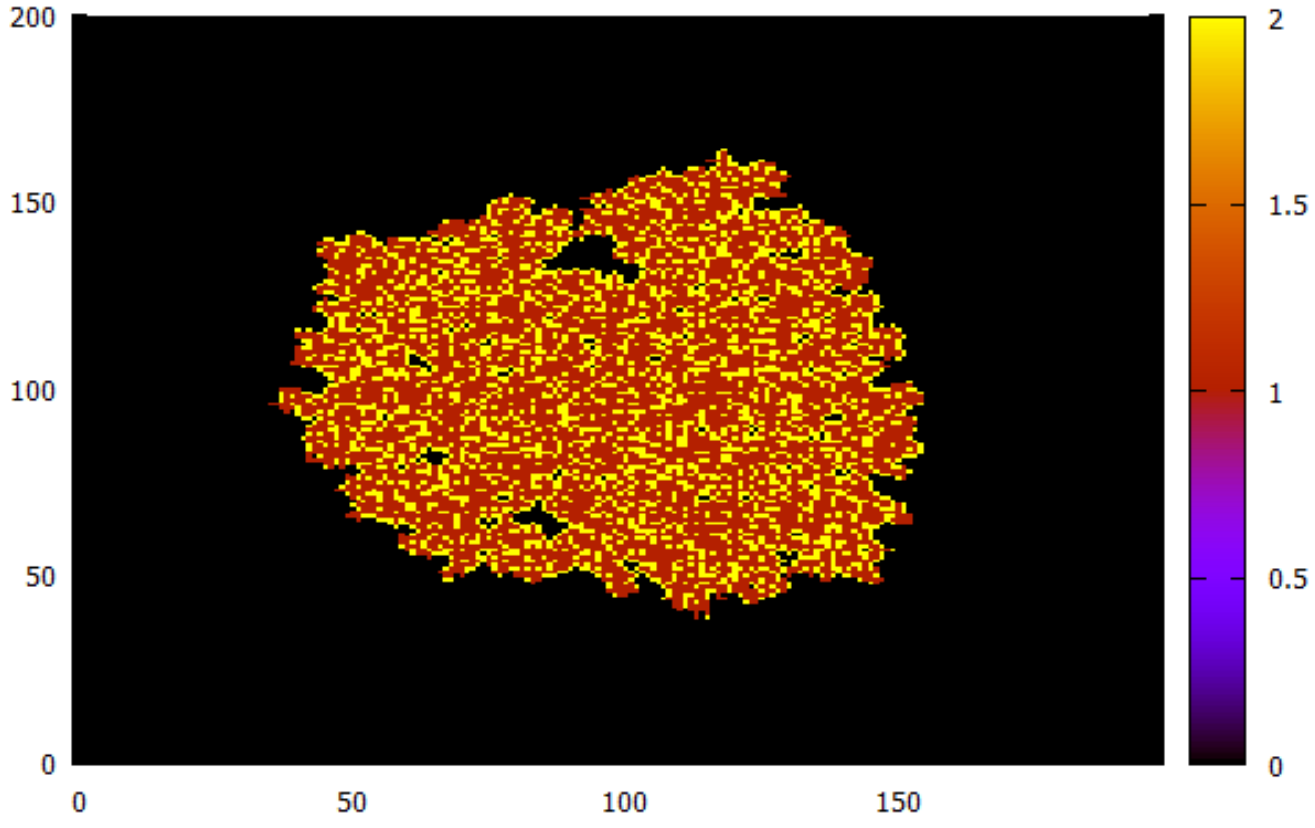

Figure 7: Cluster of $N = 10000$ grown using the epidemic model for $p = 0.70$.

Epidemic Model for $p < p_c$

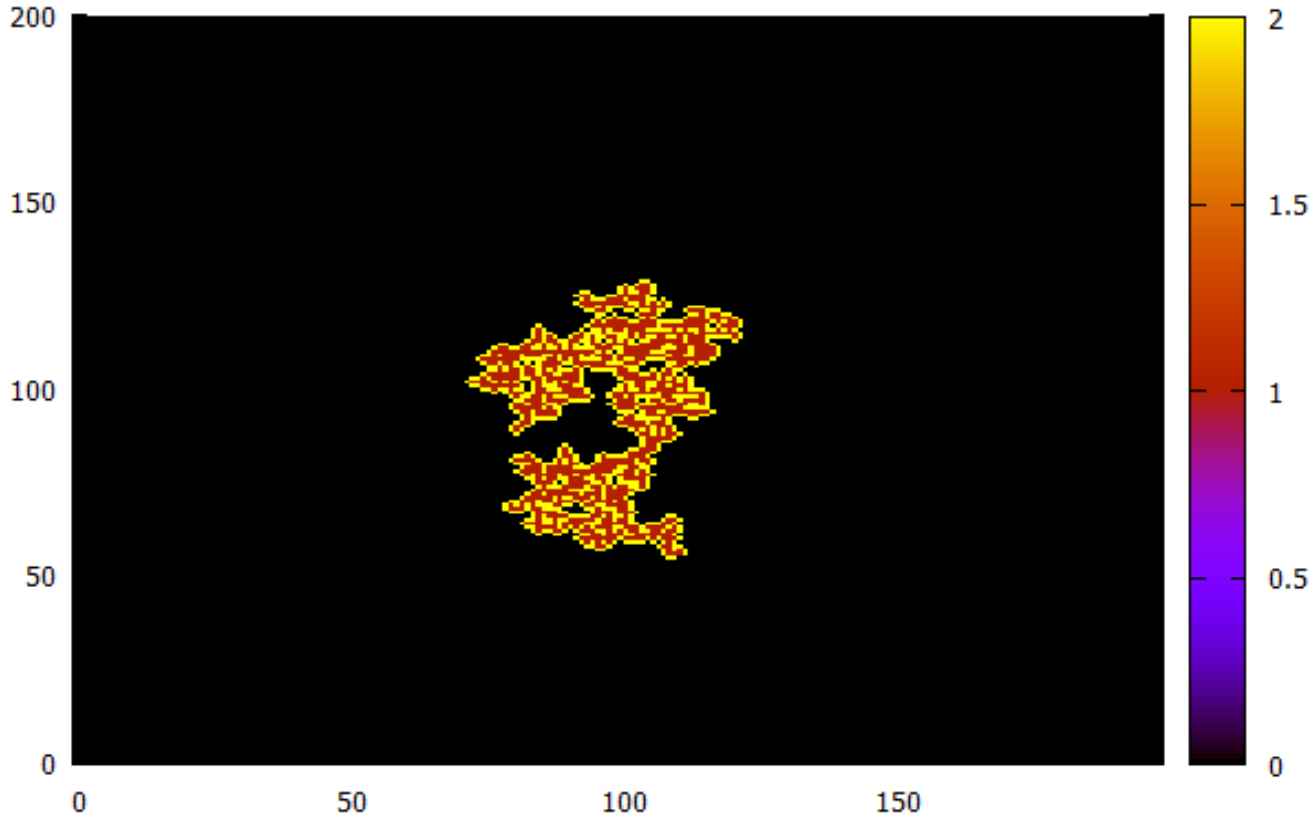

Figure 8: Cluster of $N = 1688$ grown using the epidemic model for $p = 0.55$.

Diffusion Limited Aggregation (DLA)

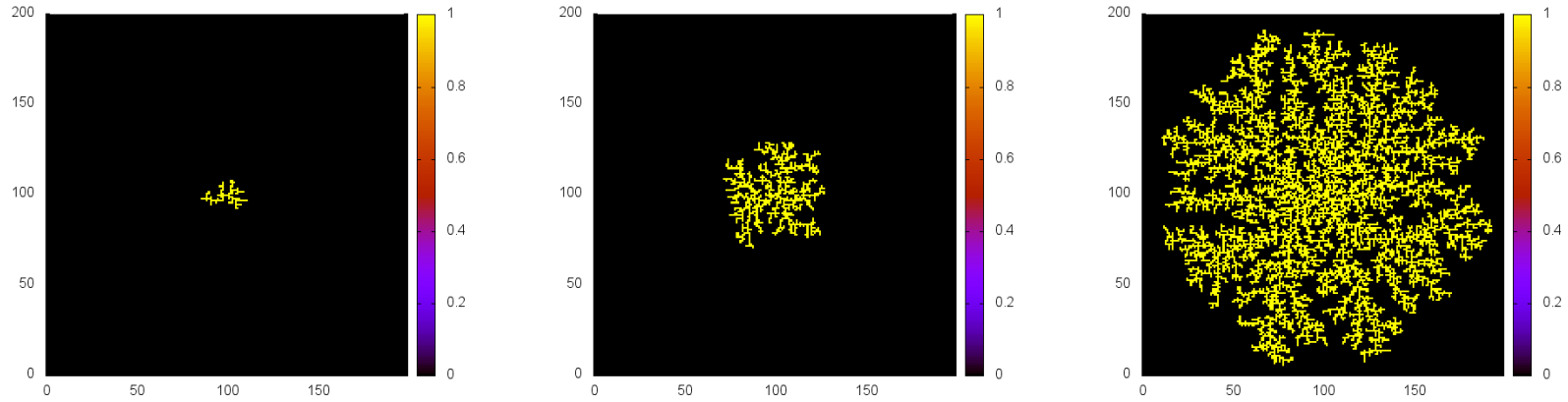

Figure 9: Cluster formed using the DLA model at N=100, N=1000, and N=10000.

Diffusion Limited Aggregation (DLA)

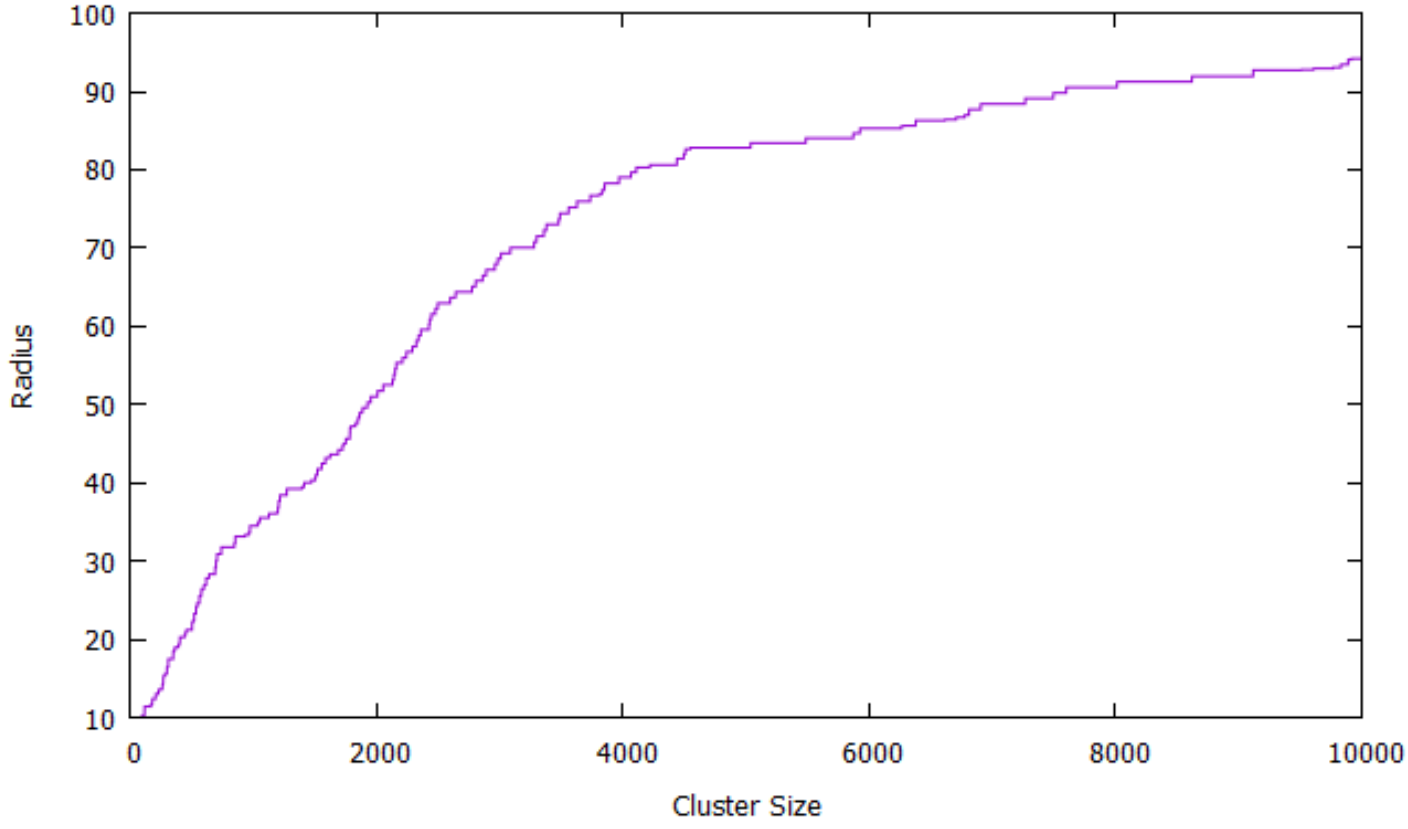

Figure 10: Radius as a function of time for a DLA cluster of size $N = 10000$.

Diffusion Limited Aggregation (DLA)

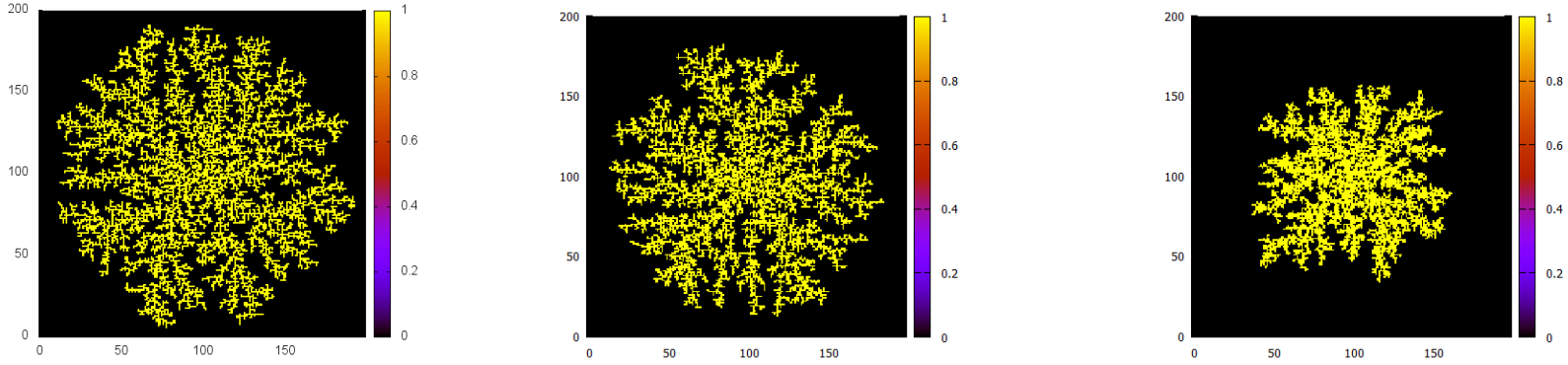

Figure 11: DLA cluster of size 10000 with a sticking probability of 1.0, 0.5, and 0.1.

Thank You