Comparison of analytical results with simulations

for Balázs from Alexander with Yannis

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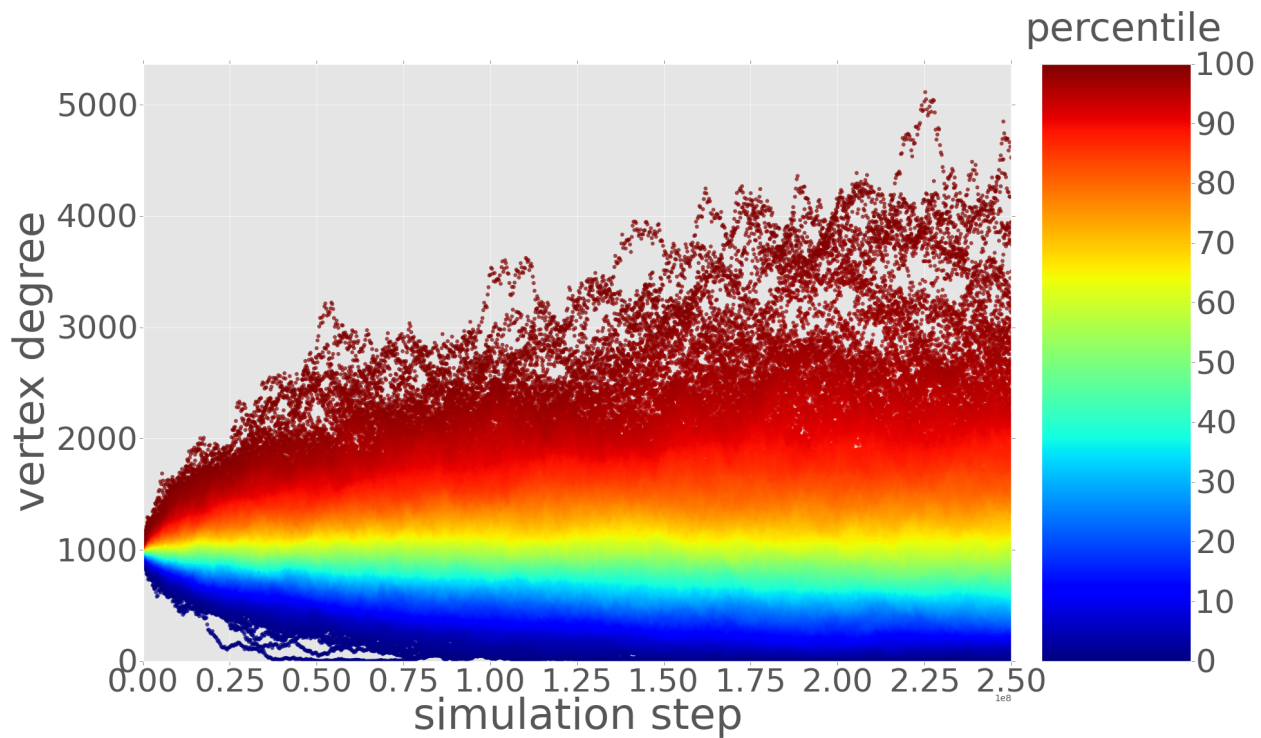

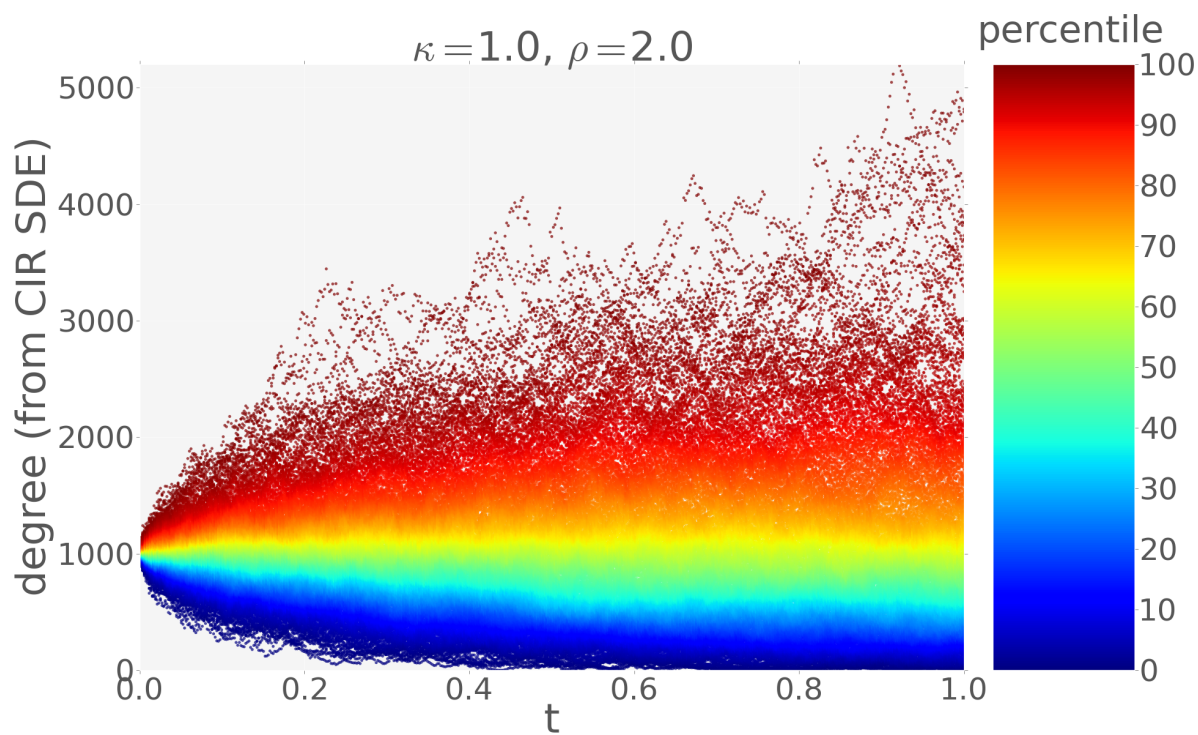Figure 1: Evolution of degrees from direct simulation, $n = 500 \ \kappa = 1 \ \rho = 2$, axis scale is 10^8.

Figure 2: Evolution of degrees from analytical C.I.R. equation $n = 500 \ \kappa = 1 \ \rho = 2$, 500 trajectories are shown
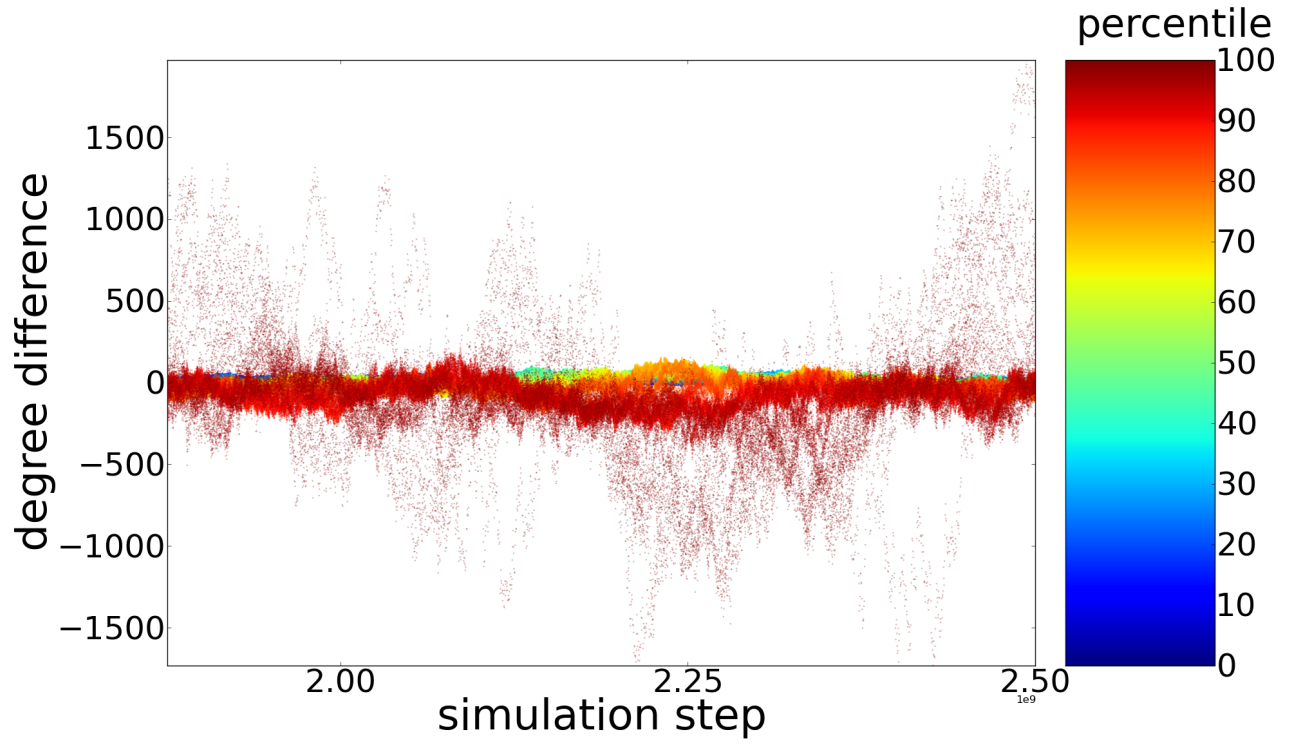
Figure 3: Difference in equilibrium degree distribution, $n = 500$ $\kappa = 1$ $\rho = 2$, axis scale is 10^9. To obtain an approximation of the analytical distribution, the poisson distribution, (36) in [1], was sampled to create an $n \times n$ adjacency matrix A_i. The degrees distribution $deg(A_i)$ was then calculated. This process was repeated fifty times, and the sorted degree distributions, $deg(A_i)$ $i = 1, 2, ..., 50$ were averaged to obtain one final, average, steady state distribution. These sorted, analytically-based degrees were then subtracted from the sorted degrees arising from the simulation. Taking this difference at each time-step results in the above figure.
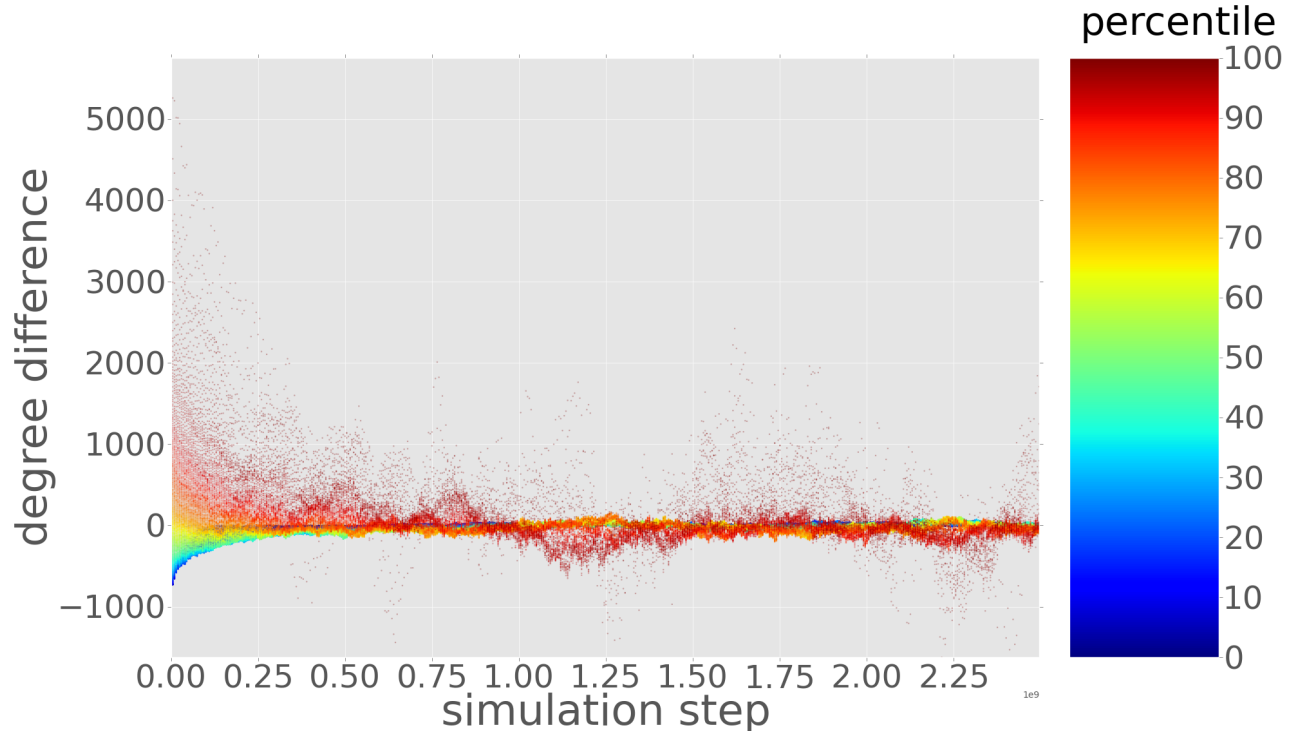

Figure 4: Difference in equilibrium degree distribution over entire simulation, $n = 500$ $\kappa = 1$ $\rho = 2$, axis scale is 10^9.

References

[1] B. Ráth. Time evolution of dense multigraph limits under edge conservative preferential attachment dynamics. *Random Structures & Algorithms*, 41(3):365–390, 2012.