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Natural emergence of clusters and bursts in network evolution
JAMES BAGROW, DIRK BROCKMANN, Northwestern University — Network models with *preferential attachment*, where new nodes are injected into the network and form links with existing nodes proportional to their current connectivity, have been well studied for some time. Extensions have been introduced where nodes attach proportional to arbitrary fitness functions. However, in these models attaching to a node increases the ability of that node to gain more links in the future. We study network growth where nodes attach proportional to the clustering coefficients, or local densities of triangles, of existing nodes. Attaching to a node typically lowers its clustering coefficient, in contrast to preferential attachment or rich-get-richer models. This simple modification naturally leads to a variety of rich phenomena, including non-poissonian bursty dynamics, community formation, aging and renewal. This shows that complex network structure can be modeled without artificially imposing multiple dynamical mechanisms.

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