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A phase transition on the evolution of bootstrap percolation processes on preferential attachment graphs

We will consider bootstrap percolation processes on random graphs generated by preferential attachment. This is a class of processes where vertices have two states: they are either infected or susceptible. At each round every susceptible vertex which has at least r infected neighbours becomes infected and remains so forever. Assume that initially a(t) vertices are randomly infected, where t is the total number of vertices of the graph. Suppose also that r < m, where 2m is the average degree. We determine a critical function a_c(t) such that when a(t) >> a_c(t) complete infection occurs with high probability as t grows, but when a(t) << a_c (t), then with high probability the process evolves only for a bounded number of rounds and the final set of infected vertices is asymptotically equal to a(t).

This is joint work with Mohammed Abdullah (Huawei Labs, Paris)