SEMINARIO

MATEMATICAS DISCRETAS

EXPOSITOR

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TITULO

Strict majority bootstrap percolation on augmented rings, tori and random regular graphs.

Abstract:

We study the strict majority bootstrap percolation process on graphs. Vertices may be active or passive. Initially, active vertices are chosen independently with probability p. Each passive vertex v becomes active if at least ceil($(deg(v) + 1)/2$) of its neighbors are active (and thereafter never changes its state). If at the end of the process all vertices become active then we say that the initial set of active vertices percolates on the graph. We address the problem of finding graphs for which percolation is likely to occur for small values of p. We call p_c the least p which makes percollation occur with probability 1/2.

For that purpose we study percolation on different topologies:

-Rings of length n augmented with a universal vertex. Also, each vertex v in the ring is connected to all nodes whose distance to v is less than or equal to a parameter r.

- $n?n$ toroidal grids augmented similarly.

- Random regular graphs of even degree, also augmented with a universal node.

For the augmented rings, a number of results can be obtained analytically. In particular we know that, in an asymptotic sense, $p_c = 1/4$. This is the smallest p_c known so far.

In an attempt to find graphs with lower p_c, we computationally estimated the percolation threshold for the other two families. The tori seem more promising, with $p_c < 1/5$. On the other hand, for the random regular graphs we obtained unexpectedly large values for p_c.

Viernes 20 de junio a las 16 : 15 hrs, en la Sala Multimedia.