Institut für Diskrete Mathematik

Combinatorics Seminar

Friday 6th October 12:30

AE06, Steyrergasse 30

Majority bootstrap percolation on product graphs

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Bootstrap percolation is a spreading process on graphs where starting with an initial set A of infected vertices, other vertices become infected once a certain threshold r of their neighbors are infected. We say that the set A percolates if eventually all vertices of the graph are infected. When $r = d(v)/2$, where $d(v)$ is the degree of a vertex, that is, when a vertex becomes infected once half of its neighbors are already infected, we call the process *majority bootstrap percolation.*

We analyse this process when the initial set A is chosen randomly, with each vertex being assigned to A_p with a fixed probability p independently, which in some way represents the 'typical' behaviour for sets of density p. Balogh, Bollobás and Morris considered this process on the hypercube, a well-studied geometric graph, and demonstrated a sharp threshold for the property that the set A_p percolates. We determine a similar sharp threshold for a broader class of *product graphs*, those arising as the cartesian product of many graphs of fixed order.

Joint work with Mauricio Collares, Joshua Erde and Mihyun Kang.

Joshua Erde, Mihyun Kang