

Bootstrap Percolation and Galton–Watson Trees

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Abstract

A bootstrap process is a type of cellular automaton, acting on the vertices of a graph which are in one of two states: ‘healthy’ or ‘infected’. For any positive integer r , the r -neighbour bootstrap process is the following update rule for the states of vertices: infected vertices remain infected forever and each healthy vertex with at least r infected neighbours becomes itself infected. These updates occur simultaneously and are repeated at discrete time intervals. Percolation is said to occur if all vertices are eventually infected. For an infinite graph, of interest is the random setting, in which each vertex is initially infected independently with a fixed probability. I will give some history of this process for infinite trees and present results on the possible values of critical probabilities for percolation on Galton–Watson trees.

This talk is based on joint work with Bollobás, Holmgren, Janson, and Przykucki.

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