

The Satisfiability Threshold for k -XORSAT

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Abstract

We consider “unconstrained” random k -XORSAT, which is a uniformly random system of m linear non-homogeneous equations in \mathbb{F}_2 over n variables, each equation containing $k \geq 3$ variables, and also consider a “constrained” model where every variable appears in at least two equations. Dubois and Mandler proved that $m/n = 1$ is a sharp threshold for solvability of constrained 3-XORSAT, and analyzed the 2-core of a random 3-uniform hypergraph to extend this result to find the threshold for unconstrained 3-XORSAT. We show that $m/n = 1$ remains a sharp threshold for solvability of constrained k -XORSAT for every $k \geq 3$, and we use Molloy’s analysis of the 2-core of a random k -uniform hypergraph to extend this result to find the threshold for unconstrained k -XORSAT.

This is joint work with Boris Pittel.