

# Satisfiability threshold for random 2-SAT model

Arnab Sen

*University of California, Berkeley*

A  $k$ -SAT formula is the conjunction of a number of clauses, each of which is the disjunction of  $k$  literals (a Boolean variable or its negation). Consider a random 2-SAT formula with  $n$  variables where each clause occurs independently with probability  $c/2n$ . It is well known that, as  $n$  tends to infinity, the probability of satisfiability for a random 2-SAT formula exhibits a sharp threshold at  $c = 1$ . In fact, it has been shown in a recent work of Bollobás, Borgs, Chayes, Kim and Wilson that the length of the scaling window around the threshold is of the order  $n^{1/3}$ .

We consider a general random 2-SAT model in which each clause occurs independently but with probability  $c_i/2n$  where  $i$  is the number of positive literals in that clause. We use 2-type branching process arguments to determine similar satisfiability threshold for this model in terms of the maximum eigenvalue of the branching matrix. This approach also gives a simple proof of the value of the threshold of the standard random 2-SAT.

This is a joint work with Elchanan Mossel.

List of invited speakers

Schedule for December 14