Phase Transitions in a random NK landscape Model and a random 3-SAT problem

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We analyze the satisfiability problem of a certain random 3-SAT problem in which the appearances of 3-clauses are not independent. The random model is reduced directly from the solubility problem of a random NK landscape model with $K=3$. Proposed by Kauffman, the NK model is one of the most notable mathematical models to study the evolution on a fitness landscape, where a fitness landscape is a function that maps each genetic composition (genotype) to the fitness of the expression (phenotype) of the genetic composition in an environment. In the course of the analysis, we introduce a generalized random 2-SAT formula and show its phase transition phenomenon.

This is a joint work with Sung-Soon Choi and Kyomin Jung.