Abstract

We consider the discrete time threshold- θ contact process on a random r-regular graph. We show that if $\theta \ge 2$, $r \ge \theta + 2$, ϵ_1 is small and $p \ge p_1(\epsilon_1)$, then starting from all vertices occupied the fraction of occupied vertices is $\ge 1-2\epsilon_1$ up to time $\exp(\gamma_1(r)n)$ with high probability. We also show that for $p_2 < 1$ there is an $\epsilon_2(p_2) > 0$ so that if $p \le p_2$ and the initial density is $\le \epsilon_2(p_2)$, then the process dies out in time O(log(n)). These results imply that the process on the r-tree has a first-order phase transition.