1050-05-20 **Ji-A Yeum*** (yeum@math.ohio-state.edu), Ohio State University, Department of mathematics, 231 W 18th Avenue, Columbus, OH 43210. *Probability of solvability of random systems of 2-linear equations over $GF(2)$.*

We consider the random system of 2-linear equations over the finite field $GF(2)$ whose left hand side corresponds to the random graph $G(n,p)$ and whose right hand side consists of independent Bernoulli random variables with success probability 1/2, assuming that the right hand side is independent of the left hand side.

$G(n,p)$ is the random graph with n labeled vertices such that each of the $\binom{n}{2}$ possible edges is present in the graph independently of all others, with probability p.

We prove that when $G(n,p)$ is at the subcritical phase and $|\lambda| \gg n^{1/39}$, $|\lambda| = O(n^{1/12-\epsilon})$ with a fixed $0 < \epsilon < 1/12 - 1/39$, the probability of solvability of the random system corresponding to $G(n,p)$ is asymptotic to $e^{3/8}|\lambda|^{1/4}n^{-1/12}$ as $n \to \infty$. Also, we prove that when $G(n,p)$ is at the critical phase, the probability of solvability of the random system corresponding to $G(n,p)$ is asymptotic to $c_\lambda n^{-1/12}$ as $n \to \infty$, where the constant c_λ is expressed as a convergent double series depending on λ. (Received January 05, 2009)