1009-05-94 **Jeong Han Kim*** (jehkim@microsoft.com), Microsoft Research, One Microsoft Way, Redmond, WA 98052. *Giant component and Poisson Cloning Model.*

Since P. Erdős and A. Rényi introduced random graphs in 1959-1968, the theory of random graphs has played a central role in probabilistic combinatorics. The emergence of the giant component is one of a few subjects with the most colorful history in the area. After introducing a new (equivalent) model for the random graph, called the Poisson cloning model, we improve and/or reprove various results regarding the giant component. For instance, the following theorem, which improves Łuczak's result, can be proven:

Theorem. Let $p = (1+\varepsilon)/n$ with $n^{-1/3} \ll \varepsilon < 1$ and $1 \ll \alpha \ll (\varepsilon^3 n)^{1/2}$. Then, with probability $1 - e^{-\Omega(\alpha^2)}$, the random graph $G(n,p)$ has the largest component of size between

$$\theta_\varepsilon n - \alpha(n/\theta_\varepsilon)^{1/2} \quad \text{and} \quad \theta_\varepsilon n + \alpha(n/\theta_\varepsilon)^{1/2},$$

where θ_ε is the larger solution for the equation $1 - \theta - e^{-\theta(1+\varepsilon)} = 0$.

If time arrows, we will discuss a more general problem, namely, the problem of the giant component of the graph that is the union of a fixed graph and a random graph. (Received August 08, 2005)