CONCENTRATION OF DEGREES IN THE DUPLICATION-DIVERGENCE MODEL

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We pursue the analysis of the degree of a fixed vertex, maximum degree, and average degree in a dynamic duplication-divergence graph model defined by Solé et al. in which a new node arriving at time t first randomly selects an existing node and connects to its neighbors with probability p, and then connects to the other nodes with probability r/t. This model is often said to capture the growth of some real-world processes e.g. biological or social networks.

In this paper we present a method to prove that for $0 < p < 1$ with high probability both the degree of a fixed early vertex, the maximum degree, and the maximum degree is asymptotically quite surely concentrated around t^p, t^p, and $\max\{O(1), t^p\}$, respectively, i.e. it deviates from this value by at most a polylogarithmic factor.

References

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