Annals of Combinatorics 8 (2004) 93-101
0218-0006/04/010093-9
DOI 10.1007/s00026-004-0207-5

Annals of Combinatorics

Distance-2-Matchings of Random Graphs

C.M. Reidys

Los Alamos National Laboratory, MS M997, CCS-5, Los Alamos, NM 87545, USA
reidys@lanl.gov

Received April 28, 2003

AMS Subject Classification: 05C80, 05C70

Abstract. In this paper we study the maximal size of a distance-2-matching in a random graph $G_{n,M}$, i.e., the probability space consisting of subgraphs of the complete graph over n vertices, K_n, having exactly M edges and uniform probability measure. A distance-2-matching in a graph Y, M_2, is a set of Y-edges with the property that for any two elements every pair of their 4 incident vertices has Y-distance ≥ 2. Let $\mathsf{M}_2(Y)$ be the maximal size of a distance-2-matching in Y. Our main results are the derivation of a lower bound for $\mathsf{M}_2(Y)$ and a sharp concentration result for the random variable $\mathsf{M}_2 : G_{n,M} \to \mathbb{Z}$ for $M = c(n-1)/2$ with $c > 0$.

Keywords: random graph, martingale, distance-2-matchings

References

1. N. Alon, J. Spencer, and P. Erdős, The Probabilistic Method, Wiley-Interscience Series in Discrete Mathematics and Optimization, A Wiley-Interscience Publication, John Wiley & Sons, New York, 1992.
2. K. Azuma, Weighted sum of certain dependent variables, Tohoku Math. J. **3** (1967) 357–367.
3. B. Bollobás, Random Graphs, Academic Press, London, 1985.
4. J.L. Doob, Stochastic Processes, John Wiley & Sons, New York, 1953.
5. M. Karoński, J. Jaworski, and A. Ruciński, Eds., Random Graphs, Chapter 1, North-Holland Publishing Co., Amsterdam, 1987.
6. B. Maurey, Construction de suites symmétriques, C. R. Acad. Sci. Paris Sér. A-B **289** (1979) A679–A681.