Franek, F.; Rödl, Vojtěch
Ramsey problem on multiplicities of complete subgraphs in nearly quasirandom graphs.
(English) [Zbl 0772.05070]
Graphs Comb. 8, No. 4, 299-308 (1992).

Summary: Let \( k_t(G) \) be the number of cliques of order \( t \) in the graph \( G \). For a graph \( G \) with \( n \) vertices let \( c_t(G) = \binom{k_t(G) + k_t(G)}{2} \). Let \( c_t(n) = \min \{ c_t(G) : |G| = n \} \) and let \( c_t = \lim_{n \to \infty} c_t(n) \). An old conjecture of P. Erdős [Publ. Math. Inst. Hung. Acad. Sci., Ser. A7, 459-464 (1962; Zbl 0116.01202)], related to Ramsey’s theorem states that \( c_t = 2^{1/(2t)} \). Recently it was shown to be false by A. Thomason [J. Lond. Math. Soc., II. Ser. 39, No. 2, 246-255 (1989; Zbl 0638.05037)]. It is known that \( c_t(G) \sim 2^{1/(2t)} \) whenever \( G \) is a pseudorandom graph. Pseudorandom graphs — the graphs “which behave like random graphs” — were introduced and studied in F. R. K. Chung, G. L. Graham and R. M. Wilson [Combinatorica 9, No. 4, 345-362 (1989; Zbl 0715.05057)] and A. Thomason [Random graphs ’85, Lect. 2nd Int. Semin., Poznań/Pol. 1985, Ann. Discrete Math. 33, 307-311 (1987; Zbl 0632.05045)]. The aim of this paper is to show that for \( t = 4 \), \( c_t(G) \geq 2^{1/(2t)} \) if \( G \) is a graph arising from pseudorandom by a small perturbation.

MSC:
05C55 Generalized Ramsey theory
05C80 Random graphs (graph-theoretic aspects)

Keywords:
Ramsey problem; multiplicities; nearly quasirandom graphs; conjecture of Erdős; cliques; Ramsey’s theorem; pseudorandom graph; small perturbation

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References:

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