

Ramsey graphs induce subgraphs of many different sizes

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1 Abstract

A graph on n vertices is said to be C -Ramsey if every clique and independent set of the graph has size at most $C \log n$. The only known constructions of Ramsey graphs are probabilistic in nature and it is believed that such graphs possess many of the same properties as dense random graphs. A conjecture of Erdős and McKay addresses such a property: they ask whether there exists a constant $\gamma = \gamma(C)$ such that every C -Ramsey graph on n vertices contains an induced subgraph with k edges for any $k \in \{0, \dots, \gamma n^2\}$.

We make the following small step towards the solution of this conjecture: we prove that for any fixed $C > 0$, if G is a C -Ramsey graph on n vertices, then there are at least $n^{2-o(1)}$ different positive integers k that occur as the number of edges of some induced subgraph of G .

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