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A note on the size of a chordal subgraph. (In English)

Combinatorics, graph theory and computing, Proc. 16th Southeast. Conf., Boca Raton/Fla. 1985, Congr. Numerantium 48, 81-86 (1985).

[For the entire collection see Zbl 619.00006.]

"If a graph is not chordal, it is quite appropriate to ask the following questions: (1) What is the maximum order of a chordal subgraph? (2) What is the maximum size of a chordal subgraph?

This paper is a first attempt to answer question (2). Let $f(n,t)$ denote the smallest positive integer for which every graph $G(n, f(n,t))$ contains a chordal subgraph of size at least t. We show here that $f(n,n) = [n^2/4] + 1$. Further, we prove that any $G(n, [n^2/4]+1)$ contains a chordal subgraph of size $n(1+\epsilon)$ if $n > n_0(\epsilon)$, where $\epsilon > 0$ is a fixed positive number. At present we cannot determine the exact value of ϵ. In fact, in such a graph we show the existence of a triangle xyz, with deg x+ deg y + deg $z > n(1+\eta)$ for small $\eta > 0$, such that the triangle xyz together with the incident edges of x, y, z gives such a chordal subgraph."

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05C38 Paths and cycles
05C35 Extremal problems (graph theory)

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