Mikhail Makarov
Moscow Institute of Physics and Technology

Logical complexity of induced subgraph isomorphism for certain graph families

For a given graph F, let $I(F)$ denote the class of all graphs containing an induced copy of F and let $v(F)$ be the number of its vertices. Let $D[F]$ denote the minimum quantifier depth of a sentence in the first order logic with the adjacency and the equality relations that defines $I(F)$. In this work we present three previously unexplored graph families for which holds $D[F] \leq n-1$, $D[F] = n-1$, $D[F] = n$, respectively. On top of that, we show that for F with $v(F) = 5$, $D[F] \geq 4$.

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References

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