

Kneis, Joachim; Mölle, Daniel; Richter, Stefan; Rossmanith, Peter

A bound on the pathwidth of sparse graphs with applications to exact algorithms. (English)

Zbl 1219.05187

SIAM J. Discrete Math. 23, No. 1, 407-427 (2009).

The authors resented a bound of $m/5.769 + O(\log n)$ on the pathwidth of graphs with m edges. Respective path decompositions can be computed in polynomial time. Using a well-known framework for algorithms that rely on tree decompositions, this directly leads to runtime bounds of $O^*(2^{m/5.769})$ for **Max-2SAT** and **Max-Cut**. Both algorithms require exponential space due to dynamic programming. If we agree to accept a slightly larger bound of $m/5.217 + 3$, we even obtain path decompositions with a rather simple structure: all bags share a large set of common nodes. Using branching based algorithms it may be possible to solve the same problems in polynomial space and time $O^*(2^{m/5.217})$.

Reviewer: [I. M. Erusalimskiy \(Rostov-on-Don\)](#)

MSC:

[05C85](#) Graph algorithms (graph-theoretic aspects)
[68R10](#) Graph theory (including graph drawing) in computer science
[68W01](#) General topics in the theory of algorithms

Cited in **9** Documents

Keywords:

[graph algorithms](#); [graph theory](#); [algorithm](#); [pathwidth](#)

Full Text: [DOI](#)