Fixed-parameter tractable algorithm and polynomial kernel for Max-Cut Above Spanning Tree. (English) Zbl 1434.68748
Theory Comput. Syst. 64, No. 1, 62-100 (2020).

Summary: Every connected graph on \(n\) vertices has a cut of size at least \(n - 1\). We call this bound the spanning tree bound. In the Max-Cut Above Spanning Tree (Max-Cut-AST) problem, we are given a connected \(n\)-vertex graph \(G\) and a non-negative integer \(k\), and the task is to decide whether \(G\) has a cut of size at least \(n - 1 + k\). We show that Max-Cut-AST admits an algorithm that runs in time \(O(8^k n^{O(1)})\), and hence it is fixed parameter tractable with respect to \(k\). Furthermore, we show that Max-Cut-AST has a polynomial kernel of size \(O(k^5)\).

MSC:
68W40 Analysis of algorithms
05C85 Graph algorithms (graph-theoretic aspects)
68Q27 Parameterized complexity, tractability and kernelization
68R10 Graph theory (including graph drawing) in computer science

Keywords:
max-cut; above guarantee parameterization; fixed-parameter tractable algorithm; polynomial kernel

Full Text: DOI

References:

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