

Best Paper Track A: A $4/3$ Approximation for 2-Vertex-Connectivity

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Best Paper Track A:

Abstract: The 2-Vertex-Connected Spanning Subgraph problem (2VCSS) is among the most basic NP-hard (Survivable) Network Design problems: we are given an (unweighted) undirected graph G . Our goal is to find a subgraph S of G with the minimum number of edges which is 2-vertex-connected, namely S remains connected after the deletion of an arbitrary node. 2VCSS is well-studied in terms of approximation algorithms, and the current best (polynomial-time) approximation factor is $10/7$ by Heeger and Vygen [SIDMA'17] (improving on earlier results by Khuller and Vishkin [STOC'92] and Garg, Vempala and Singla [SODA'93]).

Here we present an improved $4/3$ approximation. Our main technical ingredient is an approximation preserving reduction to a conveniently structured subset of instances which are “almost” 3-vertex-connected. The latter reduction might be helpful in future work.

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