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Summary: We introduce a new geometric spanner whose construction is based on a generalization of the known stable roommates problem. The stable roommates spanner combines the most desirable properties of geometric spanners: a natural definition, small degree, linear number of edges, strong \((1 + \varepsilon)-\)spanner for every \(\varepsilon > 0\), and an efficient construction algorithm. It is an improvement over the well-known Yao graph and \(\Theta\)-graph and their variants.

We show how to construct such a spanner for a set of points in the plane in \(O(n \log^{10} n)\) expected time. We introduce a variant of the stable Roommates spanner called the stable roommates \(\Theta\)-spanner which we can generalize to higher dimensions and construct more efficiently in \(O(n \log^d n)\) time. This variant possesses all the properties of the stable roommates spanner except that it is no longer a strong spanner.

MSC:
05C22 Signed and weighted graphs
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)

Keywords:
geometric spanners; Yao graph; \(\Theta\)-graph; stable roommates

Full Text: DOI

References:
[6] Y. Wang, X.-Y. Li, Distributed spanner with bounded degree for wireless ad hoc networks, in: IPDPS’02: Proc. of the 16th International Parallel and Distributed Processing Symposium, 2002, p. 120.

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