Abstract

Let S be a set of n points on a polyhedral terrain $T \in \mathbb{R}^3$, and let $\varepsilon > 0$ be a fixed constant. We prove that S admits a $(2+\varepsilon)$-spanner with $O(n \log n)$ edges with respect to the geodesic distance. This is the first spanner with constant spanning ratio and a near-linear number of edges for points on a terrain.? On our way to this result, we prove that any set of n weighted points in $\mathbb{R}^d$ admits an additively weighted $(2+\varepsilon)$-spanner with $O(n)$ edges; this improves the previously best known bound on the spanning ratio (which was $5+\varepsilon$), and almost matches the lower bound.