Spanning Properties of Variants of the Delaunay Graph

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Abstract

A weighted geometric graph G is a graph whose n vertices are points in the plane and whose m edges are line segments weighted by the Euclidean distance between their endpoints. A t-spanner of G is a connected spanning subgraph G' with the property that for every pair of vertices x, y, the shortest path from x to y in G' has weight at most $t \geq 1$ times the shortest path from x to y in G. The parameter t is commonly referred to as the spanning ratio or the stretch factor. Typically, G is a graph with $\Omega(n^2)$ edges. As such, the goal in this area is to construct a subgraph G' that possesses several desirable properties such as $O(n)$ edges and spanning ratio close to 1. In addition, when planarity is one of the desired properties, variants of Delaunay graphs play a vital role in the construction of planar geometric spanners. In this talk, we will provide a comprehensive overview of various results concerning the spanning ratio, among other several other properties, of different types of Delaunay graphs and their subgraphs.

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