

Problem 5: Euclidean Minimum Spanning Tree

Problem Description: Can the Euclidean minimum spanning tree (MST) of n points in \mathbb{R}^d be computed in time close to the lower bound of $\Omega(n \log n)$ [GKFS96]

Origin : Uncertain, pending investigation.

Abstract : Euclidean Minimum Spanning Tree is a kind of minimum spanning tree that with a set of n points in a plane or generally in \mathbb{R}^d and in this tree, the weight of every edge between two points is the distance between the two points. That means Euclidean Minimum Spanning Tree is to minimum the total distance in the spanning tree. In this study, we will focus on whether computing this Euclidean minimum spanning tree's bound can be lower than $\Omega(n \log n)$ or not.

Addition Problem : In addition, we may study about the MST's randomized algorithm of complexity such as $O(n \log \log n)$ which has been already known. And maybe we will try to find the algorithm for higher dimensions.

Bibliography:

GKFS96

Dima Grigoriev, Marek Karpinski, Friedhelm Meyer auf der Heide, and Roman Smolensky.

A lower bound for randomized algebraic decision trees.

In Proc. 28th Annu. ACM Sympos. Theory Comput., pages 612-619, 1996.