

AN IMPROVED INSERTION HEURISTIC FOR THE EUCLIDEAN MINIMUM STEINER TREE PROBLEM

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Abstract: *The Euclidean Steiner Tree Problem is to find a shortest network spanning a set of fixed points in the plane, allowing the addition of auxiliary points to the set. The problem being NP-hard, polynomial-time approximations or heuristics are required. There are many rather complex heuristics based, e.g., on enumerating full topologies and consuming long time for computations for large instances. In this paper, we applied to use tools of computational geometry, especially the properties of Delaunay triangulation, a well-known geometric structure, and combine them with insertion heuristics based on the construction of the Euclidean minimum spanning tree. Thus an algorithm could be proposed that is very efficient and fast. Experiments confirmed that computations by this algorithm generate very good results in a reasonable amount of time, even for large instances of the studied problem.*

Key words: *Steiner tree, spanning tree, Delaunay triangulation, time complexity, NP-hard problems*



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1. Introduction