Summary: Let \( R \) and \( B \) be two disjoint sets of points in the plane where the points of \( R \) are colored red and the points of \( B \) are colored blue, and let \( n = |R \cup B| \). A bichromatic spanning tree is a spanning tree in the complete bipartite geometric graph with bipartition \((R, B)\). The minimum (respectively maximum) bichromatic spanning tree problem is the problem of computing a bichromatic spanning tree of minimum (respectively maximum) total edge length. (1) We present a simple algorithm that solves the minimum bichromatic spanning tree problem in \( O(n \log^3 n) \) time. This algorithm can easily be extended to solve the maximum bichromatic spanning tree problem within the same time bound. It also can easily be generalized to multicolored point sets. (2) We present \( \Theta(n \log n) \)-time algorithms that solve the minimum and the maximum bichromatic spanning tree problems. (3) We extend the bichromatic spanning tree algorithms and solve the multicolored version of these problems in \( O(n \log n \log k) \) time, where \( k \) is the number of different colors (or the size of the multipartition in a complete multipartite geometric graph).

MSC: 
68R10 Graph theory (including graph drawing) in computer science  
05C85 Graph algorithms (graph-theoretic aspects)  
68U05 Computer graphics; computational geometry (digital and algorithmic aspects)

Keywords: multipartite geometric graphs; minimum spanning tree; maximum spanning tree

Full Text: DOI arXiv

References:

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.