Abstract

The Steiner minimum tree (SMT) problem is one of the classic nonlinear combinatorial optimization problems for centuries. The Steiner tree problem finds the minimum cost tree connecting a given set of nodes called required nodes in a given undirected weighted graph. In this minimum cost Steiner tree due to the reduction of path-cost, some non-required nodes are also used while finding the SMT, which are called Steiner nodes. The Steiner path problem comes from the Steiner tree problem of finding the minimum cost path connecting a given set of nodes called required nodes in a given undirected weighted graph. The Steiner path problem can be characterized as either a decision or optimization problem. This paper focuses on solving the Steiner path as a decision problem. The Steiner Path decision problem finds whether there is a path connecting a given set of nodes called required nodes in a given binary tree. The decision that whether there exists a Steiner path or not can help in further solving the Steiner path optimization problem. Since the Steiner tree decision problem has wide scales, we should use an efficient algorithm with least complexity. In this paper we have defined the steiner path decision problem, characterized sufficient conditions for finding the steiner path and presented an algorithm for finding the existence of a steiner path in a 2-tree.
References


Index Terms

Computer Science

Algorithms

Keywords
Steiner Path Decision Problem  Steiner Path  Graph Theory  Algorithms  Sufficient conditions for Steiner path