Novel approach based on the weight adjacency matrix to obtain the minimum weight spanning tree

K.P.O. Niluminda [1,*] and E.M.U.S.B. Ekanayake [1]

[1] Department of Physical Science, Rajarata University of Sri Lanka.
[*] Corresponding author email: kponiluminda@gmail.com

Abstract: A graph's spanning tree is created when all of its vertex connections are made without any cycles, giving rise to the term "Minimum Weight Spanning Tree (MWST)," which is the tree that has the shortest possible length among spanning trees. The traditional switch or bridge methods are contrasted with connection and path cost techniques that are more appropriate for wireless applications. Various methods have been established to detect MWST. The MWST can be found using either Kruskal's algorithm or Prim's algorithm, which are both highly regarded and well-known methods. When the graph is sparse, it is preferable to use Kruskal's algorithm, and when the graph is solid, it is preferable to use Prim's algorithm. As compared to Kruskal's method, which is based on lines, Prim's approach is node-based. In this study, we propose an alternative algorithm to find the MWST of a given undirected connected graph using the weight (cost) adjacency matrix. Finally, the suggested approach is demonstrated using a numerical example. We obtain results that are comparable to those of Prim's and Kruskal's algorithms.

Keywords: Adjacency matrix, Kruskal's algorithm, Minimum weight spanning tree, Prim's algorithm, Undirected graph