Abstract

Graph theory is an ancient branch of engineering. Many problems of real-world have been solved by graph theory’s principles. In this survey paper, I want to present the plane 3-tree’s concept with an interesting branch of another topic of graph theory, that is, chordal bipartite graph. Throughout the development of this survey paper, we will present definitions of chordal graph, bipartite graph, tree, plane 3-tree and different operations of tree architecture. Then I will show a new way to look at the tree architecture with nearest neighbor interchanges. Nearest Neighbor Interchanges is a mechanism that deals with the operation of relative nodes in a tree architecture. Relative nodes are those nodes which come in a same branch or in different branch of a tree which do not interrupt the way from leaf to root with other nodes in the same branch or in another branch are used in the nearest neighbor interchanges to interchange or exchange. We have many applications in which we can apply this nearest neighbor interchange mechanism. The main application is in DNA matching, DNA synthesizing and ribosome particles analysis. I will clearly describe these features in detail in the specified sections of this survey paper. Next I want to show that plane 3-tree has passed the planarity criteria, that is, plane
3-tree is a planar graph and it has straight-line drawing. So, we can construct a bipartite, chordal and chordal bipartite graph which is relevant with the given plane 3-tree. The novelty of this survey paper comprised of several definitions, graphical illustrations of different graph operations and chordal bipartite equivalent of a plane 3-tree.

**References**


**Index Terms**

Computer Science  
Applied Mathematics

**Keywords**

Graph, Tree, Planarity, Nearest Neighbor Interchanges, Chordality, Bipartite graph, Plane 3-Tree