

1106-05-2062

Chelsea M Lawhorn* (lawhornc2@winthrop.edu), 251 E Jonest St, Blacksburg, SC 29702, and
Joseph Rusinko. *Path Systems: A New Systematic Approach to Finding Quartets.*

Phylogenetic trees, or topological representations of evolutionary data, are constructed using groupings of paired taxa known as quartets. The number of quartets which could accurately describe a tree is very large, roughly T^4 where T is the number of taxa on a tree. Because the total number of compatible quartets which could define a tree is so extensive, it would be helpful to find an algorithm which could systematically choose a subset of quartets which would return a correct tree using MaxCut, a computer software program which returns a phylogenetic tree using the quartets it is given. Currently, quartet amalgamation systems focus on quartets which distinguish single edges on a phylogenetic tree. However, in this work, we explore a new way of creating quartets, known as a path system, in which the quartets not only distinguish single edges, but also distinguish paths of adjacent edges. We discover how a path system uses consistent taxa pairs in the quartets it creates in order to help MaxCut return a correct tree. In addition, we find that path systems not only consistently return a correct tree using MaxCut, but do so using a significantly fewer number of quartets than other systems. (Received September 15, 2014)