Invariant Rooting Algorithm

April 25, 2015

Score Computation :

The invariant penalty score computation involves only inequalities.

1 Analysis of output

We have analyzed the 10-taxon datatset and also the Avian dataset. First, we will discuss the results on the 10-taxon followed by the Avian dataset.

1.1 10-taxon dataset

We have analyzed 3 replicates on the dataset from higher to lower ILS. For each of the 3 replicates of the four model conditions we have performed two experiments :-

1. Fixed quintet - we have taken a fixed quintet *['1','3','5','7','8']* and have scored the edges which a induced in the subtree of the quintet.
2. Shortest Quintet - For each edge we have taken the shortest quintet (quintets topologically closer to the edge) such that edge is induced by the quintet.

1.2 Output Format of 5-taxon tree

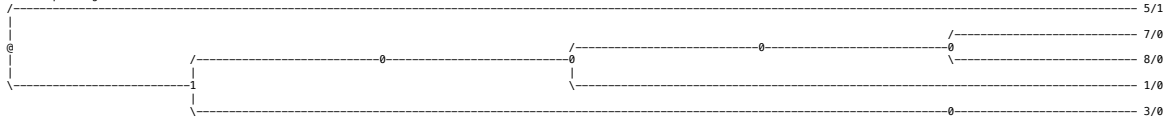
It contains the taxons which are part of the quintet and the edges which are induced by the quintet (i.e. it also retains the nodes with out-degree 1).

1. For a leaf node, the node label is of the format v_1v_2, where v_1 represents the taxon label and v_2 denotes the score of the edge leading to that node.
2. For an internal node, the value represents the score of the edge leading to that node.

The **U** below each figure denotes the corresponding frequency of the gene tree topology.

********** Model Condition -model.10.5400000.0.000000037/ Replicate -1/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5-taxon tree

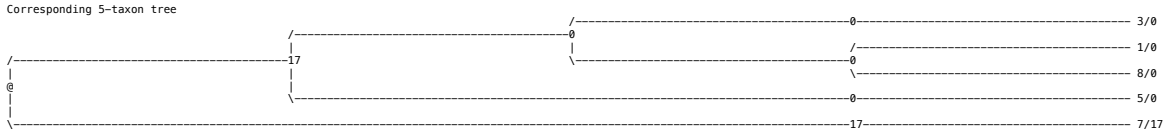


U = [955, 23, 22, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

Analysis:-
1)best score on the dataset - 0
2)# edges that have the best score - 9

********** Model Condition -model.10.5400000.0.000000037/ Replicate -2/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5-taxon tree

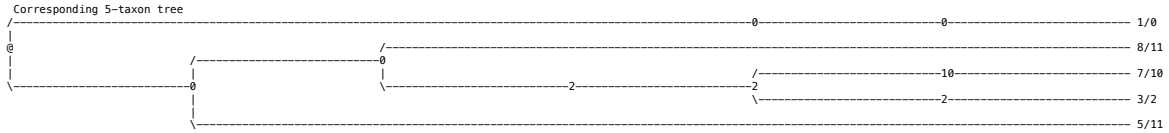


U = [409, 304, 287, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 8

********** Model Condition -model.10.5400000.0.000000037/ Replicate -3/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5-taxon tree

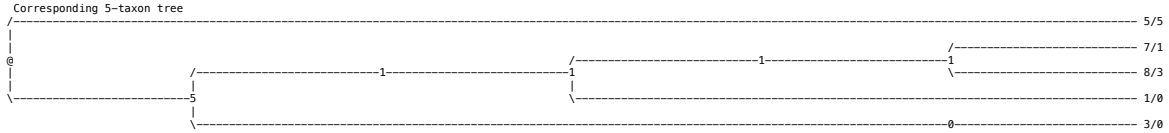


U = [799, 83, 92, 14, 0, 2, 0, 0, 2, 0, 0, 2, 6, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 6

********** Model Condition -model.10.1800000.0.000000111/ Replicate -1/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5-taxon tree



U = [681, 155, 153, 2, 3, 1, 0, 0, 1, 0, 0, 0, 4, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 3

********** Model Condition -model.10.1800000.0.000000111/ Replicate -2/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5-taxon tree

U = [302, 93, 92, 131, 55, 63, 1, 3, 59, 2, 4, 45, 136, 7, 7]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 4

********** Model Condition -model.10.1800000.0.000000111/ Replicate -3/ **********
quintet ['1', '3', '5', '7', '8']

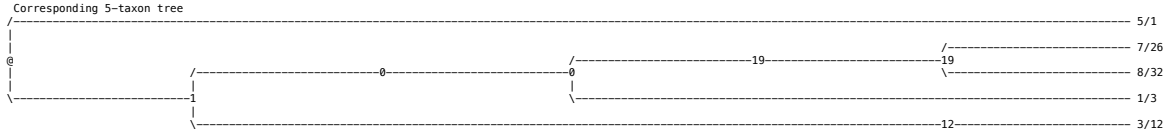
Corresponding 5-taxon tree

U = [711, 39, 27, 102, 10, 8, 0, 0, 3, 0, 0, 4, 96, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 3

********** Model Condition –model.10.600000.0.000000333/ Replicate –1/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5–taxon tree

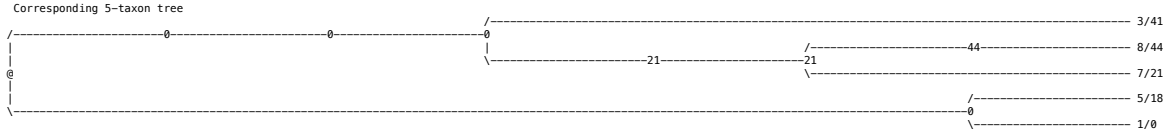


U = [362, 203, 202, 28, 24, 32, 10, 12, 28, 6, 10, 29, 38, 7, 9]

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 2

********** Model Condition –model.10.600000.0.000000333/ Replicate –2/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5–taxon tree

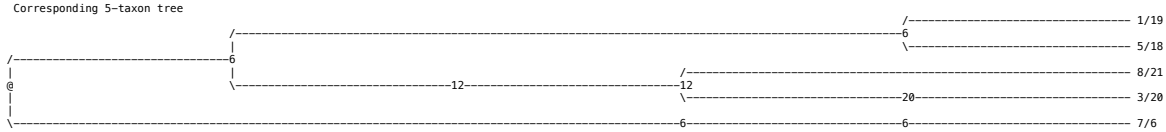


U = [470, 70, 85, 129, 28, 31, 0, 4, 26, 5, 1, 32, 111, 3, 5]

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 5

********** Model Condition –model.10.600000.0.000000333/ Replicate –3/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5–taxon tree

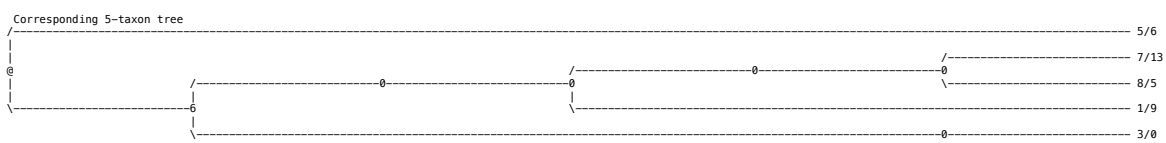


U = [94, 86, 145, 51, 47, 80, 51, 41, 71, 64, 39, 60, 54, 41, 76]

Analysis:–
1)best score on the dataset – 6
2) # edges that have the best score – 5

********** Model Condition –model.10.200000.0.000001000/ Replicate –1/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5–taxon tree

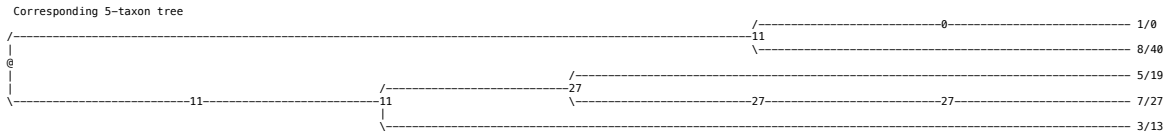


U = [182, 167, 161, 57, 43, 43, 30, 24, 43, 39, 48, 40, 48, 31, 44]

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 5

********** Model Condition –model.10.200000.0.000001000/ Replicate –2/ **********
quintet ['1', '3', '5', '7', '8']

Corresponding 5–taxon tree

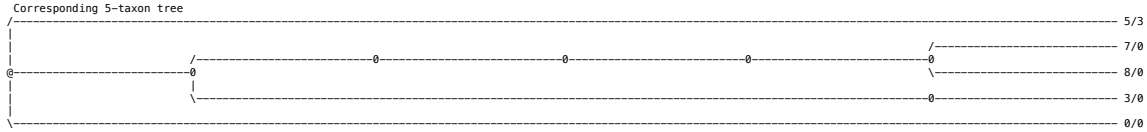


U = [152, 92, 91, 74, 85, 57, 41, 29, 72, 50, 37, 68, 67, 40, 45]

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 2

**********   Quintet which includes the outgroup **********
Here we will be analyzing the above dataset with a different quintet which includes the outgrip

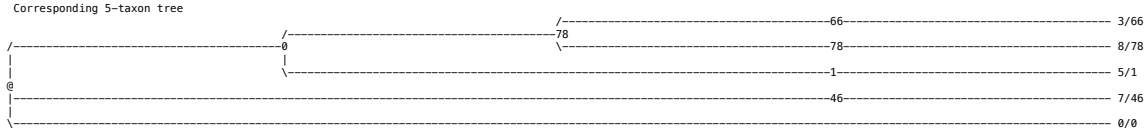
 ********** Model Condition -model.10.5400000.0.000000037/ Replicate -1/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree


U = [499, 249, 252, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 10

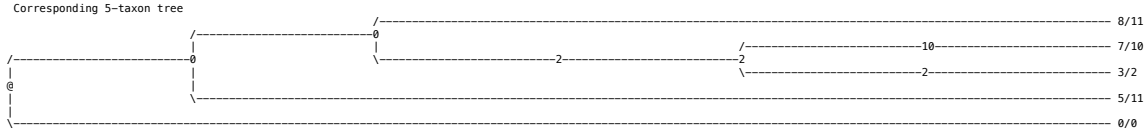
 ********** Model Condition -model.10.5400000.0.000000037/ Replicate -2/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree


U = [149, 98, 127, 96, 63, 80, 22, 33, 93, 20, 22, 61, 95, 26, 15]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 3

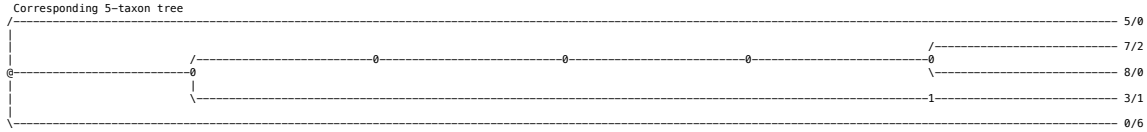
 ********** Model Condition -model.10.5400000.0.000000037/ Replicate -3/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree


U = [799, 83, 92, 14, 0, 2, 0, 0, 2, 0, 0, 2, 6, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 3

********** Model Condition -model.10.1800000.0.000000111/ Replicate -1/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree


U = [399, 301, 295, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 8

 ********** Model Condition -model.10.1800000.0.000000111/ Replicate -2/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree


U = [534, 80, 71, 115, 16, 32, 0, 1, 20, 2, 0, 25, 104, 0, 0]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 1

 ********** Model Condition -model.10.1800000.0.000000111/ Replicate -3/ **********
quintet ['0', '3', '5', '7', '8']

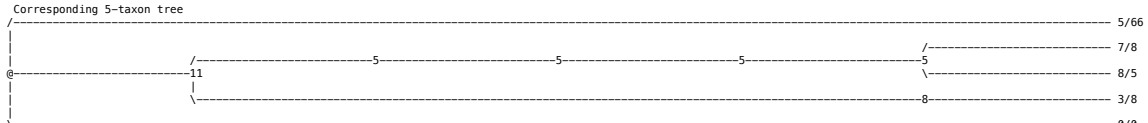
 Corresponding 5-taxon tree


U = [592, 161, 172, 17, 6, 8, 2, 0, 14, 1, 0, 13, 13, 0, 1]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 2

 ********** Model Condition -model.10.600000.0.000000333/ Replicate -1/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree

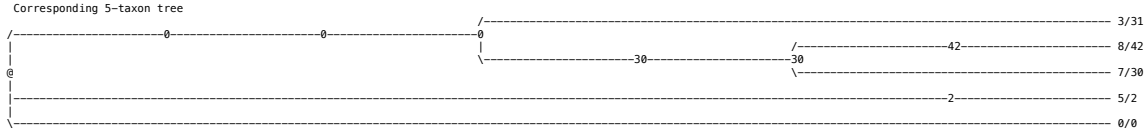


U = [285, 244, 281, 19, 12, 30, 11, 11, 34, 10, 12, 15, 13, 10, 13]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 1

 ********** Model Condition -model.10.600000.0.000000333/ Replicate -2/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree



U = [410, 107, 109, 99, 44, 44, 3, 3, 32, 7, 3, 36, 99, 2, 2]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 4

 ********** Model Condition -model.10.600000.0.000000333/ Replicate -3/ **********
quintet ['0', '3', '5', '7', '8']

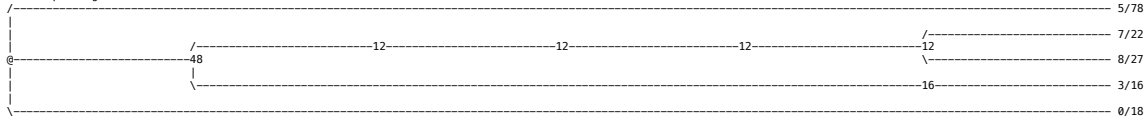
 Corresponding 5-taxon tree

U = [112, 93, 117, 82, 71, 108, 32, 28, 106, 19, 32, 69, 62, 37, 32]

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 2

 ********** Model Condition -model.10.200000.0.000001000/ Replicate -1/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree

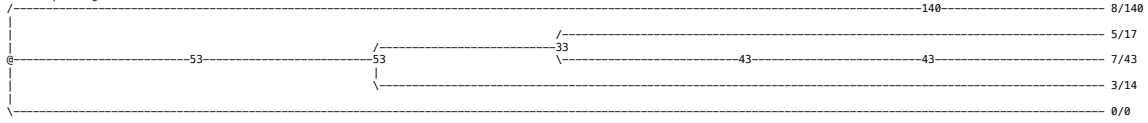


U = [170, 179, 194, 29, 38, 53, 25, 35, 69, 38, 32, 35, 37, 32, 34]

Analysis:-
1)best score on the dataset - 12
2) # edges that have the best score - 4

 ********** Model Condition -model.10.200000.0.000001000/ Replicate -2/ **********
quintet ['0', '3', '5', '7', '8']

 Corresponding 5-taxon tree



U = [123, 89, 132, 57, 57, 101, 40, 38, 76, 37, 32, 76, 64, 43, 35]

Analysis:-
1)best score on the dataset - 0