1. Relatedness of OTUs: For any two OTUs in the UPGMA tree, does the NJ tree represent them as the closest to each other?

Answer: No. There is no such pair for those UPGMA and NJ represent as closest.

2. Distance between OTUs: For OTUs that have the smallest distance between them in the UPGMA tree, is the distance between the same OTUs in the NJ tree the smallest also? For OTUs that have the next to smallest distance between them in the UPGMA tree, is the distance between the same OTUs in the NJ tree the next to smallest as well? And so forth for the remaining pairs of OTUs.

Answer:

The distances are given in the following table as ascending order:

|  |  |  |  |
| --- | --- | --- | --- |
| UPGMA | | NJ | |
| Name | Distance | Name | Distance |
| Seq10 | 2995.6183 | Seq6 | 1278.2523 |
| Seq12 | 2995.6183 | Seq4 | 1323.001 |
| Seq14 | 2995.6183 | Seq2 | 1330.6534 |
| Seq3 | 3000.4254 | Seq3 | 1344.5695 |
| Seq5 | 3000.4254 | Seq5 | 1360.9104 |
| Seq7 | 3000.4254 | Seq7 | 1434.4808 |
| Seq11 | 3000.4254 | Seq11 | 2876.0648 |
| Seq6 | 3000.4254 | Seq14 | 2892.5771 |
| Seq9 | 3000.4254 | Seq9 | 2905.2963 |
| Seq4 | 3000.4254 | Seq12 | 2918.3633 |
| Seq18 | 3000.4254 | Seq18 | 2923.0915 |
| Seq15 | 3000.4254 | Seq15 | 2924.1849 |
| Seq16 | 3000.4254 | Seq16 | 2927.3336 |
| Seq17 | 3000.4254 | Seq17 | 2928.447 |
| Seq1 | 3000.4254 | Seq1 | 2929.8375 |
| Seq8 | 3000.4254 | Seq8 | 2930.7536 |
| Seq13 | 3000.4254 | Seq13 | 2943.4594 |
| Seq2 | 3000.4254 | Seq10 | 2944.126 |

The first three smallest distances are not same in UPGMA and NJ tree. We can relate the other distances between them. We can relate Seq1, Seq3, Seq5, Seq7, Seq8, Seq9, Seq11, Seq13, Seq15, Seq16, Seq17 and Seq18 as distance order between UPGMA and NJ.