



4. [10 pts.] What are the major differences between DIVA and Lagrange? What are the strengths and weaknesses of each?

Part two, longer answers:

5. [20 pts.] Phylogenetic diversity metrics have many uses. First, describe what the metric is (and the several variants of it that we discussed. Then describe: (a) how a phylogenetic diversity metric might be used in conservation biology and how it might differ from the standard species-count metric, and (b) how a phylogenetic diversity metric might be used to test a scientific hypothesis of your choice and how it might differ from the standard species-count metric.

6. [20 pts.] Some historical biogeography methods assume that each OTU and each reconstructed ancestor lives in one and only one region. Others allow the OTUs and ancestors to live in multiple regions. (a) Give an example of a situation where you might prefer each of these assumptions. (b) For both of these kinds of methods, the scientist has to choose what the "regions" are going to be a priori. How should she go about choosing these regions?

7. [20 pts.] Can reticulation be studied using phylogenetics? Or, does reticulation destroy our ability to do phylogenetics? Discuss these opposing viewpoints as they relate to: (a) species concept debates in eukaryotes, and (b) views of bacterial evolution. In addition to theory, also consider what empirical methods people might apply given their different viewpoints.