

Statistical Estimation of Phylogeny: An Outline

Statistical paradigm

pose substantive question

develop stochastic model with parameters that, if known, would answer the question.

collect observations that are informative about model parameters.

find the best estimate of parameters conditioned on the observations at hand using some criterion.

Statistical phylogenetic paradigm

what if the phylogeny of a group of organisms?

develop phylogenetic model with tree (and branch lengths) and a Markov model describing how traits change over tree.

construct a data matrix (e.g., of DNA sequences) sampled from the group of organisms.

find the best estimate of phylogeny using maximum likelihood criterion or Bayesian inference criterion.