

Introduction to Bioinformatics for Computer Scientists

Excercise 10

Likelihood

- Given:
 - A two state binary alphabet 0/1
 - The stationary frequencies $\pi = (\pi_0, \pi_1) = (0.5, 0.5)$
 - A Γ model of rate heterogeneity with 2 discrete rates r_1 and r_2
 - And a transition probability matrix for

Rate r_1

$$P_{0 \rightarrow 1}(0.2) = 0.1$$

$$P_{0 \rightarrow 1}(0.3) = 0.2$$

$$P_{0 \rightarrow 0}(0.2) = 0.9$$

$$P_{0 \rightarrow 0}(0.3) = 0.8$$

$$P_{1 \rightarrow 0}(0.2) = 0.1$$

$$P_{1 \rightarrow 0}(0.3) = 0.2$$

$$P_{1 \rightarrow 1}(0.2) = 0.9$$

$$P_{1 \rightarrow 1}(0.3) = 0.8$$

Rate r_2

$$P_{0 \rightarrow 1}(0.2) = 0.2$$

$$P_{0 \rightarrow 1}(0.3) = 0.3$$

$$P_{0 \rightarrow 0}(0.2) = 0.8$$

$$P_{0 \rightarrow 0}(0.3) = 0.7$$

$$P_{1 \rightarrow 0}(0.2) = 0.2$$

$$P_{1 \rightarrow 0}(0.3) = 0.3$$

$$P_{1 \rightarrow 1}(0.2) = 0.8$$

$$P_{1 \rightarrow 1}(0.3) = 0.7$$

- Compute the likelihood and log likelihood on the following tree

Tree 1

