

Math 5233 Jukes-Cantor and Kimura model worksheet

Group members (1 to 3): _____

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seq1 GCTGCGTATTC
seq2 GCTGCGTTTCCTT
seq3 AGTGCCCTACTTT
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- (1) Calculate the evolutionary distance d in the Jukes-Cantor model for every pair of the above sequences. ($d = -\frac{3}{4} \ln(1 - \frac{4}{3}D)$.)

- (2) Repeat the above exercise with Γ -distributed rates with shape parameter $a = 1/4$.

$$(d = \frac{3}{4}a((1 - \frac{4D}{3})^{-\frac{1}{a}} - 1).)$$

- (3) Repeat the above exercise using the Kimura model.
($d = -\frac{1}{2} \ln(1 - 2S - V) - \frac{1}{4} \ln(1 - 2V)$.)

- (4) Which makes more of a difference to the ratio d_{23}/d_{12} (compared to the Jukes-Cantor model), using the Kimura model or the JC+ Γ model with $a = 1/4$?