Apply Markov Process Theory on Mutation Rate of Hepatitis B Virus Sequence

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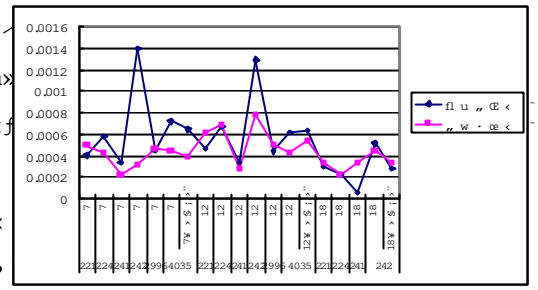
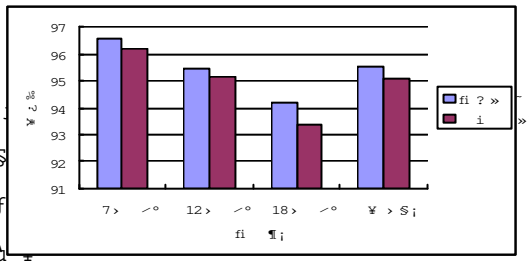
¯ † v ⁄ª∆ƒ¡ h – ˜ ¥ ¸ ⁄ ‰ » { ł ″°•



Substitution rate: fi ? » ˜ ‹ ¯ † v S Ø ‰ u „ ˇ

$$\frac{-(3/4)\ln[1-(4/3)p]}{2T} \quad (1)$$



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H ($Stochastic process)¡A» P ƒ ^ ´ k… ƒ

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¶ ¨ fl " ¥ (experiment)¡Aƒ ¤ C ƒ „ Œ¯ fi ? » ˜ » P »i˜ fl S † S ´ I S · ƒ C „ w · œ¥¿‰T†v⁄æ,ß„ˇ

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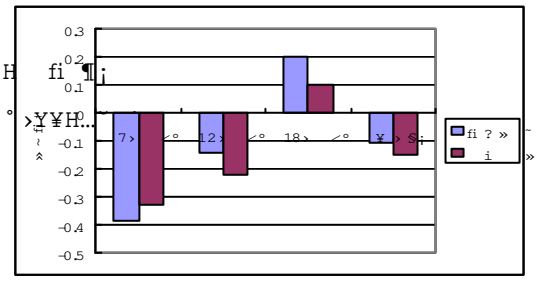
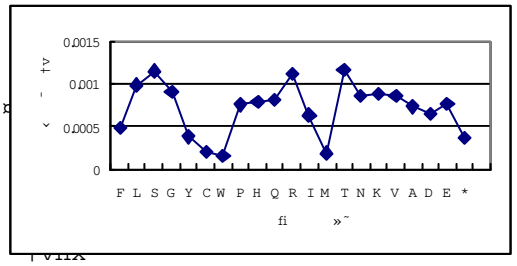


ƒ ¡ " ¥ : ƒp⁄U

$$P(X_{n+1}=s_{n+1}\mid X_n=s_n, X_{n-1}=s_{n-1}.....,X_0=s_0)$$
$$=P(X_{n+1}=s_{n+1}\mid X_n=s_n), where 0=t_0<t_1<\ldots<t_n<t_{n+1}, \forall s_i\in S$$

⁄] · N XO»¶"CDF» P ⁄ W ⁄ @ › X¯‹[„ ¡¯A fi ? » ˜ » P i » ˜ ‹ ¯ † v „w · œ»~fit⁄æ⁄æ,ß„ˇ

~ ' ⁄ @ " (short-range dependence).



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⁄ @ ƒ ~ ⁄ S , Œ fi ˜ ¡Æ¥S@ ª∆‰m¶ p " ´ ,m

}¡Aƒ » P † ˜ ⁄ @ S ,1Œfi˜‹ ¶Z° ⁄ S S · ƒC‹ · œ i » ˜ ‹ ¯ " " †v⁄ t„ˇ