1.11.2012

Mathematical theory of population genetics

Exercises 6.

1. (3 points) Find out (in genetics literature, or by using google, wikipedia etc.) the magnitude of mutation rates that organisms (e.g. humans) experience.

2. (3 points) Consider mutations of two alleles (so that, say A_1, is the wild/resident-type and A_2 is the mutant) but no selection. Suppose that back mutation (mutation from mutant allele back to the resident-type) happens hundred times as rarely as the mutation from the resident type to the mutant type. What is the frequency distribution at the equilibrium.

3. (6 points) Consider a two allele haploid population which undergoes mutation and selection. Suppose that the back mutation from the mutant type A_2 back to the resident type A_1 is 0 (i.e. $\mu_{21} = 0$) and that $\mu_{12} > 0$. Give a condition for which the mutant allele A_2 is protected.