1 Mutation

( ) Here we describe a biallelic system where A mutates to a at some frequency μ, and a mutates to A at frequency ν

$$p' = (1-\mu)p + (1-p)\nu \tag{1}$$

2 Migration

( ) Here we describe a biallelic system where individuals move from a continent (mainland), with an allele frequency of p_C, to an island at a net migration rate of m. The allele frequency on the island p_I.

$$p'_I = (1-m)p_I + mp_C \tag{2}$$

3 Selection

( ) Here we describe a biallelic system where selection acts on each genotype based on the value of the relative fitness of each genotype (w_{AA}, w_{Aa}, w_{aa}).

$$p' = \frac{w_{AA}p^2 + w_{Aa}p(1-p)}{w_{AA}p^2 + w_{Aa}2p(1-p) + w_{aa}(1-p)^2} \tag{3}$$

4 Combining Mutation, Migration, and Selection Models

( ) Here we describe a biallelic system where A mutates to a at some frequency μ, and a mutates to A at frequency ν, individuals move from a continent (mainland), with an allele frequency of p_C, to an island at a net migration rate of m. The allele frequency on the island p_I, and selection acts on each genotype based on the value of the relative fitness of each genotype (w_{AA}, w_{Aa}, w_{aa}).

$$\begin{aligned} p_1 &= (1-\mu)p_0 + (1-p_0)\nu \\ p_2 &= (1-m)p_1 + mp_C \\ p' &= \frac{w_{AA}p_2^2 + w_{Aa}p_2(1-p_2)}{w_{AA}p_2^2 + w_{Aa}2p_2(1-p_2) + w_{aa}(1-p_2)^2} \end{aligned} \tag{4}$$

5 Inbreeding

( ) Here we describe a biallelic system where inbreeding takes place.

$$
\begin{aligned}
f(AA) &= p^2(1-F) + pF \\
f(Aa) &= 2p(1-p)(1-F) \\
f(aa) &= (1-p)^2(1-F) + qF
\end{aligned}
\tag{5}
$$