

## Homework May 12, 2015 (to be returned on May 19)

Run a computer simulation to reproduce the result shown during the lectures about the final heterozygosity as a function of the distance from the selected locus, as measured by the ratio  $s/r$  (selection over recombination rates). It is reminded that selection acts only on locus  $A$  (selection coefficients:  $1, 1 - hs, 1 - s$  for  $A_1A_1, A_1A_2, A_2A_2$ , respectively) while the second diallelic locus  $B$  is taken neutral. The frequency  $p_1$  of the selected allele  $A_1$  is initially  $1/2N$  ( $N$  being the population size) and sweeps then to high values (stochastic fluctuations are neglected). Run the simulation up to high values of  $p_1$ , e.g.  $p_1 \geq 0.9999$ , and measure the heterozygosity  $2p_2q_2$ . Suppose additivity  $h = 1/2$  for simplicity. Try different values of the population size  $N = 1,000; 5,000; 10,000$  and selection coefficient  $s = 10^{-4}, 10^{-3}, 10^{-2}$  and see how much that changes the graph, always using  $r/s$  as measure of the distance.