Homework #7

(due Monday, May 6)

You can use the shortened short_mutt_gamete_event.tsv (click on this link and download) data for this homework (see hw 6 for description of the data format).

We'll look at the same model that we used in the last homework, but we'll take a Bayesian perspective. So you'll need to state prior probability distributions for all input parameters/models.

#1. Implement MCMC for the two-parameter (r and w) model. Report the posterior means and 95% credible intervals for the 2 parameters.

#2. Report the PRSF (gelman diagnostic) for your MCMC runs.

#3. Implement a reversible-jump MCMC version of your code to examine the $w = 0$ as a special case submodel. Report the probability that $w > 0$. You'll need to design some move that takes you from the one parameter model ($w = 0$) to the two parameter ($w > 0$), and derive the Hasting's ratio for that move.

References:

- hastingsRatio.pdf
- code directory for MTH's lectures. `coda.R` and `continuous-mcmc.py` are particularly relevant.
- `http://patricklam.org/teaching/convergence_print.pdf`