**MLE Homework #4**

Use the “mid” data for interstate disputes contained in the Zelig package. The observations for these data are dyad-years, i.e., each observation is a pair of countries for a given year. The DV is “conflict” and is coded 1 if the dyad was engaged in a militarized interstate dispute in that year and 0 otherwise. Use the following IVs for the models below:

major = 1 if the pair of countries includes a major power, 0 otherwise

contig = 1 if the countries are contiguous, 0 otherwise

power = balance of military power between the two

years = years since the last dispute between the two

You can get the data by loading the Zelig package and referring to “mid”

library(Zelig)

data <- mid

1. Estimate a probit model of conflict regressed on all four IVs described above.
   1. Use “binnedplot” to plot the residuals against the “power” and “years” independent variables. Briefly describe what you see: are there problems with one or both? Do you have any concerns with the current use of these variables in the model?
   2. Look at influence and potential influence statistics for this model. Identify any potentially problematic data points, and investigate whether these points have substantial influence on the coefficients. Do they?
2. Estimate a robit model using the same DV and IVs using a t-distribution with 3 degrees of freedom.
3. Estimate a model using the same DV and IVs but with a complementary log-log link.
4. Estimate a rare events logit model using the same DV and IVs.
5. Estimate a logit model using the same DV and IVs but with weakly informative priors on all coefficients.
6. Plot the relationship between the predicted probability that two states are in conflict in a given year and the balance of power between the states for all 5 models on the same plot. Hold “contig” and “major” at 0 and years at “10.” Use a different line type for each model. Describe what you find. Then create a second plot where you change “major” to 1 and “years” to “0.” Again, describe what you find. You do NOT need to plot confidence intervals for any of the estimates.