Homework assignment #3

PLS 298 Applied Stat Modeling

F2019

1. Using the “litterbags.csv” data set, create and run a model in JAGS that corresponds to this one:

lmer(N\_min\_rate~Celastrus + (1|Plot), data=litterbags)

This data set contains nitrogen mineralization rates at 7 different plots where the treatment was whether or not the invasive liana *Celastrus orbiculatus* was present or not.

In your answer, please include the model code and the means and standard deviations of the intercept, slope, group-level (i.e. among-plot) variance and individual-level (within-plot) variance. Briefly report what you did to check model convergence.

2. Fit a hierarchical (multilevel) model in JAGS using the data sets “immunity.csv” and “patient\_age.csv”. The model should include “immune.level” as the response variable, “time” as an individual-level predictor, and “age” as a group-level predictor.

These data are repeated measures on individual patients, so each patient is a “group” in the data set. Each row in the data set “immunity.csv” is one observation on one patient. Each row in the data set “patient\_age.csv” is the age of each patient at time the study began – so this is a group level predictor, with one row of data per patient. In other words, here “age” is analogous to county-level bedrock uranium content in the Gelman & Hill radon example.

Hints: You can use the column “patient” in “immunity.csv” to index the random intercept for patient. You can then use the column “age” in “patient\_age.csv” in the group-level regression that explains some of the variation in the random intercepts. There is a model like this on page 361 of Gelman & Hill.

In your answer, include the model you created. Also report the means and standard deviations of:

* the slopes of the individual-data-point-level and “group”-level (i.e. patient-level) regressions
* the individual-data-point-level and “group”-level variance parameters