# Homework 5

## Problem 1

How do the Bayesian estimators of $\beta_0, \beta_1, \beta_2$, and $\sigma$ compare to the "true" values 2, 6, 0.5, and 0.8?

After running Openbugs, I got the following Bayesian Estimators:

$$\beta_0 : 1.309$$
$$\beta_1 : 6.504$$
$$\beta_2 : -0.4256$$
$$\sigma : 1.021$$

The **MSE is : 1.021**

## Problem 2

(a) Suggest two models: first with all predictors, and the second with single best predictor. Explain how did you choose the best predictor.

I used $R^2_{adj}$ to determine the performance of the model. Thus for models with different predictors, their $R^2_{adj}$ are:

$$R^2_{adj}\text{of the model with all five predictors} : 0.752$$
$$R^2_{adj}\text{of the model with Age} : 0.0837$$
$$R^2_{adj}\text{of the model with BAI} : 0.547$$
$$R^2_{adj}\text{of the model with BMI} : 0.296$$
$$R^2_{adj}\text{of the model with BB} : 0.476$$
$$R^2_{adj}\text{of the model with Gender} : 0.231$$

**So the model with single best predictor is the one with BAI.**

(b) A new person is to be evaluated using the two models from (a). The covariates are: Age = 35, BAI=26, BMI=20, Gender = 0, BB=520. What are the predicted BF's from the two models.

Predicted BF with full model is : **15.05**
Predicted BF with full model is : **24.79**

# Problem 3

Using logistic regression and noninformative priors on its parameters, estimate the proportion of responses after a shock of 2.5 milliamps. Find 95% credible set for the population proportion.

The estimated proportion of response after 2.5milliamps shock is :**0.453**.
The 95% credible set for the population proportion is: **(0.386, 0.519)**