

Module 6: Practice with Bayesian Regression Analysis

Preliminaries

- Install RTools from [here](#):
- Install and initialize the packages `rstan`, `rstanarm`, and `shinystan`.
 - Be sure to initialize any other packages you would normally use.
- In a new folder of your project for the course, create a new pdf-type Rmarkdown document.

Analysis of Well Switching

- Check out the descriptions of the datasets included with the `rstanarm` package [here](#):
- Using the **wells** dataset, perform a Bayesian linear regression that uses arsenic level, distance from well, and years of education to predict well-switching.
 - Try repeating the regression using both `normal(0)` and `laplace(0)` priors, viewing the summary of the regression output for each.
- Create a histogram of the posterior distribution for the *dist* variable from the regression using `normal(0)` priors.
- Use the leave-one-out method of measuring out-of-sample predictiveness to compute the expected log predictive density.

Analysis of doctors visits

- If necessary, install the package “Ecdat” and initialize it.
- Using the dataset **Doctor**, perform a Bayesian Poisson regression that estimates the number of doctor visits as a function of health care access and health status.
 - Perform the regression for a sample of 100 observations, for each of (1) the default priors and (2) uninformative priors.
- Once again view the summary of the output but this time view a graphical plot of the credible intervals for *access*.
- Use the Watanabe-Aikake information criterion to view the predictiveness of the Poisson model.