In-class exercise: Covariance analysis: two levels, one covariate

Names: (signatures only please, printed names will not be counted)

1.)   4.)

2.)   5.)

3.)   6.)

Overview

In this exercise we suppose we examine the difference in highway gas mileage between cars and trucks in models with and without weight as a covariate.

Instructions

As usual, start by bringing your copy of the `MTH225_Fall2016` archive up to date.

Open a command prompt or terminal window, and use the `cd` command to change to the `MTH225_Fall2016` subdirectory. Then type the command:

`git pull origin master`

The pull operation should download the following files:

- The R-knitr code: `week9_IC2_covariance_example.Rnw`

- The data in Rdata format: `EPA_mileage.Rdata`

- The STAN model file 1 `week9_IC2_covariance_example.stan`

In this exercise, the data file is in Rdata format, which you read with a `load` command. The .Rnw file is set up to do this, you should not have to modify it or the .stan files.

Questions

Use the *Compile PDF* button to run the model, and use the output to answer the following questions:

1) In the model with weight as a covariate and separate slopes for cars and trucks, what is the estimated mean difference between the intercept terms for cars and trucks, and what is the 95% confidence interval for the difference?

2) What is the estimated mean difference between the slopes for cars and trucks, and the 95% confidence interval for the difference?

3) What is the estimate of the difference in error standard deviation for cars and trucks, and the 95% confidence interval for the difference?

4) How would you explain the relationship between mpg for cars and trucks for this model?