In-class exercise: Single factor ANOVA with three levels - unequal variance

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

1.) 4.)

2.) 5.)

3.) 6.)

Instructions

In this exercise we suppose we have measurements at three levels of a factor where we *do not* assume equal variance at each level.

The data is in a file called `MTH225-6_IC2_data.csv`.

Variable names are `lvl,y1,y2,y3,y4,y5`

You should be able to use the STAN model file from the 3-level example, `ANOVA_example_1way_3levels.stan` without making any changes.

For the .Rnw file, you can use `MTH225-6_IC2.Rnw`. You will need to add code to:

- use the `read.csv()` function to read the data file.
- create local variables `lvl` and `y` to match the .stan file.
- create a variable `N` containing the number of elements in `y`. You can use the `length()` function for this.
- create a variable `L` containing the number of levels. You can hard code this if you like.

In addition, you will need to modify the STAN model file, `ANOVA_example_1way_3levels_unequal.stan`, to make `sigma_e` into an array with L elements.

Questions

1) What are the point estimates of the means, alpha[1]-alpha[3]?

2) What are the point estimates of the differences, d12, d13, and d23?

3) What are the 95% confidence intervals for the three differences? Which of them include zero?

4) What is the point estimate of the probability that alpha[1] is greater than alpha[2]? alpha[1] is greater than alpha[3]? alpha[2] is greater than alpha[3]?