

Homework No. 6

1 Instructions

Due Date: Wednesday April 22nd, 11:59 pm on Compass

Homework presentation should be neat. You should submit your homework through Compass. R codes should be submitted jointly with your report. **Please submit your digital files in .pdf or .html format**, so it is easier for the graders to open your files. If you feel it would help, you are encouraged to discuss Homework results with other students, but you have to present assignments individually using your own words. The aim of the homework is to learn the material and practice for the exams. Graduate students should attempt **all** problems unless they are labeled as UG. Undergraduate students can skip problems labeled as GR.

2 Problems

1. Problem 1:

Data on the content of milk from Canadian cows of five different breeds and two different ages can be found in the *butterfat* dataset.

- (a) Make appropriate plots of the data
- (b) Determine whether there is an interaction between breed and age.
- (c) Determine whether there is statistically significant difference between breeds and also ages.
- (d) Present regression diagnostics for your chosen model and comment whether the assumptions have been met.
- (e) Is the best breed in terms of butterfat content clearly superior to the second best breed?

2. Problem 2:

The *morley* data can be seen as a randomized block experiment with *Run* as the treatment factor and *Expt* as the blocking factor. Is there a difference between runs and what efficiency is gained by blocking?

3. Problem 3:

The *alfalfa* data arise from a Latin square design where the treatment factor is *inculum* and the blocking factors are *shade* and *irrigation*. Test the significance of the effects and determine which levels of the treatment factor are significantly different.

Note: All data sets are from the faraway library in R