Homework 6

STAT 625 Fall 2022

Due October 18, 2022, 12:30pm

1 Reading

- Read Chapter 7 of the text. Note that section 7.4 is more important than its length suggests.

2 Primary Questions:

Turn these in for your homework, or substitute some of the challenge questions below.

hint some of these problems may be easier to write by hand. If you have a way to capture your writing electronically with another application, you may include imported graphics in your knitted file using syntax like:

```
‘‘‘{r foo, out.width="100%", fig.cap="An example image."}
knitr::include_graphics("foo.pdf")
‘‘‘
```

1. Wesiberg problem 6.2 (1 part)
2. Wesiberg problem 6.5 (2 parts)
3. Weisberg problem 6.10 (4 parts)
4. Weisberg problem 6.14 (4 parts) *Hint for third part: express model A as a case of B where the model can be expressed with fewer parameters*
5. Briefly describe what is meant by the provocative section heading “Why Most Published Research Findings are False.” (1 part)

3 Extra Credit

(it is possible to get points beyond a full score for doing this problem. I highly encourage this problem!)

6. Weisberg problem 6.12 (technically 1 part, but counts as 4 parts worth of points)

4 Challenge questions:

7. Wesiberg problem 6.7 (2 parts)
8. Wesiberg problem 6.8 (1 part)
9. Weisberg problem 6.16 (1 part)
10. Weisberg problem 6.17 (1 part)
11. Briefly describe the differences between the three types of Analysis of Variance. (1 part)
12. Suppose that $Y \sim N(\beta_0 + \beta_1 X, \sigma^2)$. Write down the joint likelihood for the parameters $\beta_0, \beta_1, \sigma^2$. Find the likelihood ratio test for NH: $\beta_1 = 0$ vs AH: $\beta_1 \neq 0$ and show that this test is equivalent to the F test in this chapter. (1 part)

5 Pre-lecture Check

Complete this week’s timed pre-lecture check on **gradescope** by Tuesday at 11:30pm.