

Homework 6: Due Wednesday, March 17

Note: Questions 1 and 2 are to be done directly from the formulas in the text, not using the `lm` function. For Question 3, you may use R functions in any form that you like, and I do recommend using `lm` and other functions that go with it as discussed in class.

1. This is Question 3.7.1 of the course text (do all parts — data on sakai)
2. This is Question 3.8.1 of the course text (do all parts — same data as 3.7.1)
3. Return to the `Exam2004.txt` dataset that you saw in the midterm exam.
 - (a) Using `lm`, fit the linear regression directly in the form $\mu_Y(x) = \beta_0 + \beta_1 x$.
 - (b) Draw a scatterplot of the data (midterm scores on the x axis, final scores in the y axis) and draw the fitted straight line on the plot. Then show, on the same plot, the simultaneous 95% confidence bounds computed from the Working-Hotelling procedure.
 - (c) Compute a 95% prediction interval for the final exam score of a student who scored (i) 40, (ii) 60, (iii) 80 points on the midterm exam. For the student who scored 60, what is the probability that she or he scores more than 80 on the final? (Note that in this question, unlike what you were asked to do on the midterm exam, you are supposed to take into account the uncertainty in estimating $\hat{\beta}_0$, $\hat{\beta}_1$ and $\hat{\sigma}$. The final answer involves a t distribution.)