STA 570 — Spring 2012 — Dr. Charnigo

Written Assignment 6

This assignment is due on Thursday 26 April at 12 Noon. You may work in self-selected groups of two or three, submitting one copy of the assignment for the group.

[60] 1. The data set {BirthWeight.xls} provides gestational ages (in weeks) and birth weights (in grams) for 700 infants. Let X denote gestational age and Y birth weight. Consider a linear regression model of the form

$$Y_i = \alpha + \beta x_i + \epsilon_i.$$

You may proceed as if the ϵ_i were independent normal random variables with mean 0 and unknown but common variance σ^2.

[10] a. Report the least squares estimates of α and β.

[10] b. Report 95% confidence intervals for α and β.

[10] c. Test $H_0 : \beta = 0$ by constructing an ANOVA table and calculating an f statistic.

[10] d. Test $H_0 : \beta = 0$ by calculating a t statistic based on the least squares estimate of β.

[10] e. Calculate R^2 and describe in words what R^2 represents in this exercise.

[10] f. Provide a 95% confidence interval for the mean birth weight among all infants with gestational age 37 weeks.

[40] 2. Let p_1 and p_2 be as defined in exercise 1 of Written Assignment 4.

[10] a. Report point and 95% interval estimates for the risk difference $p_1 - p_2$.

[10] b. Report point and 95% interval estimates for the relative risk p_1/p_2.

[10] c. Report point and 95% interval estimates for the odds ratio $\{p_1/(1 - p_1)\}/\{p_2/(1 - p_2)\}$.

[10] d. How do your 95% interval estimates relate to the outcomes of the hypothesis tests conducted in exercise 1 of Written Assignment 4 ?