HW11 Group 1, Austin Halvorsen

Pedram Jahangiry

Dec 1 2020

# Problems

## Question 1

### (i)

## Question 2

### (i)

The transformed equation would be found by dividing the original, , by , which would give us:

## Question 3

### (i)

It would be **False** because WLS estimates could have more or less bias based on the degree of correlation between the error term in explanatory variables when an important

## Question 4

### (i)

Since our *df* would be the number that values can vary, we now that in our numerator, the degrees of freedom is K+1. For our denominator, the degrees of freedom is n-k-2.

### (ii)

The will always be at least as large from the BP regression and White test because in the BP test, the added variable is , which will always be no less than the original. For the White test, the fitted values are linear functions of the regressors. So we can conclude that the original value is greater or equal to the White test .

### (iii)

If we look at our F-test formula, we can see that as increases, so does our test value. So we can conclude that our test doesn’t depend on , rather, degrees of freedom is more important. Since all three tests have different *df*, it is hard to say which test gives a smaller p-value.

### (iv)

I think that it would be a bad idea. Since our equation already includes , if we add , our model would suffer from perfect collinearity.

# Computer Exercises

## Question 5

### (i)

Given that our variance should only rely on gender, our model would then look like: where women are represented by and men by

### (ii)

df4 <- sleep75  
wls4a <- lm(sleep~totwrk+educ+age+I(age^2)+yngkid+male, df4)  
pander(summary(wls4a))

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | t value | Pr(>|t|) |
| **(Intercept)** | 3841 | 239.4 | 16.04 | 1.51e-49 |
| **totwrk** | -0.1634 | 0.01816 | -8.997 | 2.153e-18 |
| **educ** | -11.71 | 5.872 | -1.995 | 0.04645 |
| **age** | -8.697 | 11.33 | -0.7677 | 0.4429 |
| **I(age^2)** | 0.1284 | 0.1347 | 0.9538 | 0.3405 |
| **yngkid** | -0.0228 | 50.28 | -0.0004535 | 0.9996 |
| **male** | 87.75 | 34.67 | 2.531 | 0.01158 |

Fitting linear model: sleep ~ totwrk + educ + age + I(age^2) + yngkid + male

|  |  |  |  |
| --- | --- | --- | --- |
| Observations | Residual Std. Error |  | Adjusted |
| 706 | 418 | 0.1228 | 0.1152 |

### (iii)

## Question 6

### (i)

df6 <- hprice1   
wls6a <- lm(price~lotsize+sqrft+bdrms, df6, method = )  
wls6b <- lm(price~lotsize+sqrft+bdrms, df6)  
pander(summary(wls6))

Quitting from lines 89-93 (HW11\_G1\_Halvorsen.Rmd) Error in summary(wls6) : object ‘wls6’ not found Calls: … withCallingHandlers -> withVisible -> eval -> eval -> pander -> summary

### (ii)

### (iii)

## Question 7

### (i)

### (ii)

### (iii)

## Question 8

### (i)

### (ii)

Our fitted values are all between 0 and 1.