Exercise 3

07 July 2020

(a) How many regressor variables are in this model?

$$\text{Number of Variables} = 3$$

(b) If the error sum of squares is 307 and there are 15 observations, what is the estimate of σ^2?

$$\sigma^2 = \frac{SSe}{N-1}$$

```
SSe<- 307
N <- 15

Variance <- SSe/(N - 1)
print(Variance)
```

```
## [1] 21.92857
```

(c) What is the standard error of the regression coefficient $\hat{\beta}_1$?

Variance σ^2 was calculated on question B, with value 21.929. The equation to discover the error of the regression coefficient is

$$SE(\hat{\beta}_1) = \sqrt{\frac{\hat{\sigma}^2}{\sum_{i=1}^{n}(x_i - \overline{x})^2}}$$

Since the value on position [3,3] on the matrix is represents

$$\sum_{i=1}^{n}(x_i - \overline{x})^2$$

, then the $SE(\hat{\beta}_1)$ is $\sigma^2 \times 0.0009108 = 0.0199725$