

HomeWork 1

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Exercise 0

<https://github.com/shatter0/Stat-632>

Exercise 1

(a) Write the equation for the least squares regression line.

$$Y_i = \beta_0 + \beta_1 x_i + \epsilon_i$$

$$Y_i = -1.1016 + 2.2606x + \epsilon_i$$

(b) R performs a t-test whether the slope is significantly different than 0. State the null and alternative hypothesis for this test. Based on the ‘p’-value what is the conclusion of the test.

$$H_0 = \beta_1 = 0$$

$$H_A = \beta_1 \neq 0$$

We reject the H_0 based on the ‘p’-value.

(c) Calculate the missing ‘p’-value for the intercept.

```
2*pt(-2.699, df = 49)
```

```
## [1] 0.009516191
```

(d) Calculate the missing t-statistic for the slope.

```
(2.2606/0.0981)
```

```
## [1] 23.04383
```

(e) Calculate a 95% confidence interval for the slope of the regression line. Does this interval agree with the hypothesis test?

```
qt(0.975, df = 49)
```

```
## [1] 2.009575
```

```
#CI
```

```
2.2606 + 2.009575 * 0.0981
```

```
## [1] 2.457739
```

```
2.2606 - 2.009575 * 0.0981
```

```
## [1] 2.063461
```

Yes, the results from the hypothesis test and confidence interval agreed because zero is not in the critical interval (2.063, 2.458), the null hypothesis is rejected.

Exercise 2

- (a) Show that the least squares estimate of the slope is given
- (b) Show that
- (c)

Exercise 3

- (a)
- (b)
- (c)
- (d)

Exercise 4

- (a)
- (b)
- (c)
- (d)