

ELEC-3800

Random Signals and Systems

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DUE DATE: 3/30/22

Project 4

Introduction

In this project, we were given a survey of various average text students send and receive. We also were tasks with recording a survey of our own and used all this data to run tasks given in the assignment.

Exercise 1

In Step 1, we were given an excel table with various numbers of students' average texts and were asked to use Matlab to calculate the sample mean. We were also asked to calculate the sample standard deviation. The code for this and the output can be seen in *Code 1* below.

```
%% Task 1
clc;
clear;
test = xlsread('project4.xlsx');
mean = mean(test)
standardDeviation = std(test)

Output:
mean =

    858.3137

standardDeviation =

    1.0645e+03
```

Code 1

Exercise 2

In step 2, we were given details of an official university survey. We asked if testing this claim requires a one-sided or two-sided hypothesis test. We were also asked Using a 94% confidence level, does the mean of the class data computed in Step 1 contradicts this claim.

To answer the two questions, yes, this experiment will require a two-sided test. Also, at a 94% confidence interval, the z-score is 1.88. The code and output for this task can be seen below in *Code 2*.

```
%% Task 1
clc;
clear;
test = xlsread('project4.xlsx');
mean = mean(test)
standardDeviation = std(test)
%% Task 2
n = 51;
mu = 1450;
z = (mean - mu)/
(standardDeviation / sqrt(n))
%%

Output:
mean =

    858.3137

standardDeviation =

    1.0645e+03

z =

   -3.9693
```

Code 2

Exercise 3

In task 3, we were asked to survey other people for our data of how much we spend and receive texts monthly. We were asked to survey 5 people of our choice and use this data and assume that the samples are Gaussian-distributed and that the standard deviation is the same as the estimate obtained from the previous data. By a 94% confidence level, we were asked if the mean of your survey data contradicts the university claim?

To answer the question, the mean of my survey contradicts the university claims as it is quite lower than the university. The code for solving this in Matlab and the output can be seen in Code 3 below.

```
%% Part 3
test2 = [1300 2000 850 400
250]; %5 random people data
mean2 = mean(test2)
u = 650;
n1 = 5;
z1 = (mean2 - u)/
(standardDeviation / sqrt(n1))

Output:
mean2 =

    960

z1 =

    0.6512
```

Conclusion

In conclusion, this project was not too difficult. I liked how we used real-world statistics we can all relate to for this project. I felt that this project was a different change of pace and I enjoyed it (as long as I did everything correctly).