PSTAT 5A: Lect. 16 Ex. 1 *Spring 2023: with Ethan P. Marzban*

Exercise 1

A university administrator at *Gaucho University* (GU) claims that GU students get, on average, 8 hours of sleep per night. A sample of 35 students had a combined average of 7.72 hours of sleep and a standard deviation of 3.8 hours. Using an $\alpha = 0.05$ level of significance, test the administrator's claims against a...

a) ...two-sided alternative
b) ...lower-tailed alternative

Solutions for part (b)

The value of our test statistic does not change from part (a):

$$\text{TS} = \frac{7.72 - 8}{3.8/\sqrt{35}} = -0.436$$

Now, since we are using a lower-tailed alternative, we use a critical value of -1.69, which can be seen using either our $t-$table or by using Python:

```
import scipy.stats as sps
sps.t.ppf(0.05, 34)
```

```
-1.6909242593357279
```

Our test rejects when the value of our test statistic is smaller than the critical value; i.e. when $\text{TS} < -1.69$. In this case, $\text{TS} = -0.436$ which is *not* less than -1.69; hence we fail to reject the null.

> At an $\alpha = 0.05$ level of significance, there was insufficient evidence to reject the null that GU students sleep an average of 8 hours per night in favor of the alternative that the true amount of sleep is *less* than 8 hours.