Homework 5

due Feb 23, 2021

1. Assume that Z follows the standard normal $N(0, 1^2)$. Find c so that $P(-c \leq Z \leq c) = 0.95$. *Hint*: notice that $c = z_{0.025}$, where $z_{0.025}$ is characterized by the property that $P(Z \geq z_{0.025}) = 0.025$.

2. Assume that X follows a t-distribution with 10 degrees of freedom. Compute the probability that $1 \leq X \leq 2$.

(Problems **3**, **4**, **5**) Recall the `heights.txt` data we used in class with 1375 mother/daughter height pairs. The following code reads in the data set as `ht`. Assume that daughter's heights data are taken from a normal distribution $N(\mu, \sigma^2)$

```
ht <- read.table(file = "heights.txt", header = T, sep = " ")
```

3. Compute the 95% confidence interval of μ. Give a brief interpretation of the confidence interval you calculated.

4. Test the null hypothesis $H_0 : \mu = 63.5$ by computing the p-value and stating your conclusion.

5. Test the null hypothesis $H_0 : \mu = 63.7$ by computing the p-value and stating your conclusion.