Session 9 – Statistical

Inference

Assignment – 1

1. If Z is norm (mean = 0, sd = 1)

# Find P(Z > 2.64)

# Find P(|Z| > 1.39)

pnorm(2.64, mean = 0, sd = 1, lower.tail = FALSE)

# P(Z > 2.64) is 0.0041

#------------------------

# Find P(|Z| > 1.39)

# = 1 - P(-1.39 < X < 1.39)

1 - (pnorm(1.39, mean = 0, sd=1) - pnorm(-1.39, mean = 0, sd=1))

# P(|Z| > 1.39) is 0.1645

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# Suppose p = the proportion of students who are admitted to the graduate school

# of the University of California at Berkeley, and suppose that a public relation

# officer boasts that UCB has historically had a 40% acceptance rate for its graduate

# school. Consider the data stored in the table UCBAdmissions from 1973. Assuming

# these observations constituted a simple random sample, are they consistent with

# the officer's claim, or do they provide evidence that the acceptance rate was

# significantly less than 40%? Use an alpha = 0.01 significance level.

View(UCBAdmissions)

class(UCBAdmissions)

# Our null hypothesis, H0 is p= 0.40

# Alternative Hypothesis , Ha is p < 0.4

-qnorm(0.99)

# z alpha = -2.326348

A <- as.data.frame(UCBAdmissions)

head(A)

xtabs(Freq ~ Admit, data = A)

# ow we calculate the value of the test statistic.

phat <- 1755/(1755 + 2771)

(phat - 0.4)/sqrt(0.4 \* 0.6/(1755 + 2771))

# t statistics is -1.680919

# Our test statistic is not less than ???2.32,

prop.test(1755, 1755 + 2771, p = 0.4, alternative = "less",

conf.level = 0.99, correct = FALSE)

# p- value i.e. 0.046 is greater than alpha i.e. 0.01

library(IPSUR)

library(HH)

temp <- prop.test(1755, 1755 + 2771, p = 0.4, alternative = "less",

+ conf.level = 0.99, correct = FALSE)

plot(temp, "Hypoth")

# so it does not fall into the critical region.

# Therefore, we fail to reject the null hypothesis that the true proportion

# of students admitted to graduate school is less than 40% and

# say that the observed data are consistent with the officer's claim at

# the alpha = 0.01 significance level.