

Exercise 1

2014/9/16

The differences of Hamilton depression scale factor measurements in 9 patients with mixed anxiety and depression taken at the first and second visit after initiation of a therapy

-0.952 0.147 -1.022 -0.430 -0.620 -0.590 -0.490 0.080 -0.010

We want to test for the median (m) of the parent distribution of these observations. Answer the questions below. Significance level is 0.05.

(Note that the sample mean and the sample standard deviation are -0.4319 and 0.4269, respectively.)

t-test

Suppose that the parent distribution is normal.

- (a) Test if the true mean (median) is zero or not.
- (b) Find 95% confidence interval for the mean.

Sign test

Suppose that the parent distribution is continuous.

- (a) Test if the true median is zero or not. What is the p-value? Can you find the rejection region?
- (b) Test if the true median is smaller than zero. What is the p-value?
- (c) Give a point estimate of the median. Can you find 95% confidence interval for the median?
- (d) Repeat (a)~(c) by the large sample approximation for the sign statistic.

Wilcoxon signed rank test

Suppose that the parent distribution is continuous and symmetric.

- (a) Test if the true median is zero or not.
- (b) Test if the true median is smaller than zero.
- (c) Give a point estimate of the median based on the Wilcoxon signed rank statistic? Can you find 95% confidence interval for the median?
- (d) Repeat (a)~(c) by the large sample approximation for the Wilcoxon signed rank statistic.