

Notation

Population mean μ .

Sample mean \bar{x} .

Population proportion p .

Sample proportion \hat{p} .

Population standard deviation σ .

Sample standard deviation s .

Mean of a population of differences μ_d .

Mean of a sample of differences \bar{d} .

Sample standard deviation for a sample of differences s_d .

C% quantile of Normal distribution z_C^* .

C% quantile of t distribution with df degrees of freedom t_C^{*df} .

Null value μ_0, p_0 .

Null hypothesis H_0 .

Alternative hypothesis H_A .

Test statistic with t null distribution T .

Test statistic with normal null distribution Z .

Difference between population means/proportions $\mu_1 - \mu_2, p_1 - p_2$.

Chapter 5: Inference for one sample

In this chapter we will learn about two important statistical techniques: confidence intervals and hypothesis tests. Confidence intervals answer the question "based on my sample, what are the plausible values for the population parameter (eg population mean)?" Hypothesis tests answer a similar question—"is parameter value μ_0 a plausible value for my population?" The mechanics of probability are used to define exactly what we mean by 'plausible,' and construct intervals or tests that satisfy this definition. For that reason, the results of these techniques are called statistical inferences.

0.1 Estimators, Standard Error

Covered in Chapter 4?

0.2 Confidence intervals

Initially illustrated via Confidence Interval for a single Proportion

1. What are they?
2. Margin of Error—estimated standard error, multiplier.
3. Definition of confidence level and its relationship with the multiplier.
4. T-distribution and interval for a single mean.
5. Examples.

0.3 What are hypothesis tests

Illustrated via hypothesis test for a single proportion, hypothesis test for a single mean, paired t-test.

1. Null and alternative hypotheses.
2. P values
3. Statistical significance.
4. One vs. two sided hypotheses.
5. Test statistics.
6. Examples.

Chapter 6: Inference for two samples

The techniques we learned about in chapter 6 can be extended to many different situations. We consider several of these in the remainder of this book. In this chapter we address hypothesis tests and confidence intervals for the difference in two proportions and the difference in two means.

1. Confidence interval for the difference in two proportions.
2. Confidence interval for the difference in two means.
3. Hypothesis test for the difference in two proportions.
4. Hypothesis test for the difference in two means.