
Monday, October 30th 2023

Due:: Day 4.6 at 11 pm

Course notes:

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Where to find material in Lock5 textbook:

- Lock5 Section 5.2 (Central Limit Theorem)
- Lock5 Sections 6.1-6.6
- Lock5 Section 6.10-6.11

Terminology of Inference

- population vs. sample
- sampling
  - from one population: iid vs. SRS
  - from two populations: paired samples vs. 2 independent samples
- point estimate, critical value (z^* or t^*), margin of error
- null and alternative hypothesis, test statistic, standardized test statistic, P-value, significance level, statistically significant result, Type I error, Type II error, null distribution

Sampling distributions for iid samples

- when CLT declares to be normal:
  - sampling distribution of $\hat{p}$
  - sampling distribution of $\bar{x}$
  - sampling distribution of $\bar{x}_1 - \bar{x}_2$
- what to use as mean and standard error, when the CLT applies
- when you can conclude the difference between an iid sample and an SRS is negligible

Confidence interval construction

- assessing if the CLT applies
- for these parameters: p, μ, and $\mu_1 - \mu_2$
- determine the critical value for a given level of confidence
- finding the margin of error, when the CLT is in play
- finding the boundaries of the confidence interval as

$$\text{(point estimate)} \pm \text{(margin of error)}$$

- interpreting a confidence interval as I've taught it, avoiding the misinterpretationsin Section 3.2 of Lock5
- Selecting a sample size so a CI for $\hat{p}$ is not wider than some specified value

Hypothesis testing

- assessing if the CLT applies
- 1-proportion and 1-sample t
- computing a standardized test statistic
- computing a P-value
- drawing an appropriate conclusion, given α
- stating, in context, what a Type I or Type II error would be
- interpreting a P-value

R commands

- Writing an appropriate command, usually one of `pnorm()` or `pt()`, whose result is the P-value corresponding to a particular test statistic and alternative hypothesis
- Writing an appropriate command to calculate the critical value, given a specified level of confidence, for confidence interval construction