Confidence interval and hypothesis testing

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Confidence interval

It is a range of admissible values..
our work is estimate population mean μ with a range of admisiable values...
if $\bar{x} \sim N(\mu, \frac{\sigma}{\sqrt{n}})$ yo could standardize:

...

$$\frac{(\bar{x} - \mu)}{\frac{\sigma}{\sqrt{n}}} \tag{1}$$

Quantile

Remember the definition of z_α is

...

$$P(X < z_\alpha) = \alpha \tag{2}$$

Upper and lower bounds

Given α we are searching two values (under and above) of zero (remember that is Z) that:

...

- Z_α
- $Z_{1-\frac{\alpha}{2}}$
- The area between Z_α and $Z_{1-\frac{\alpha}{2}}$ is equal to α

CI

...

$$P\left(z_{\frac{\alpha}{2}} \leq \frac{(\bar{x}-\mu)}{\frac{\sigma}{\sqrt{n}}} \leq Z_{1-\frac{\alpha}{2}}\right) = 1-\alpha \tag{3}$$

The before intervals were constructe

...

$$P\left(\bar{x} - z_{\frac{\alpha}{2}}\frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{x} + Z_{1-\frac{\alpha}{2}}\frac{\sigma}{\sqrt{n}}\right) = 1-\alpha \tag{4}$$

Note that σ is population parameter, if n is large you could uses sample standard deviation S.

Hypothesis testing

Laboratories

- First
- Central limit theorem
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