

Week 8 notes

ATTENTION: Some definition might differ from your textbook, please follow your textbook.

Some questions for you:

1. What's markdown and R markdown (RMD). (NOT required to know)
2. What's confidence interval (CI)?
3. What does a 95% CI mean?
 - The probability that CI will cover the population mean is 95%.

If a R.V. X follows a normal distribution $N(\mu, \sigma^2)$

Let n be the sample size, and we draw a sample from population as

$$X_1, X_2, \dots, X_n$$

We can obtain sample mean $\bar{x} = \frac{X_1 + X_2 + \dots + X_n}{n}$. The sampling distribution has standard error $\sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$. (From Chapter 7)

If we have confidence level as p (e.g. 95%), then we define $\alpha = 1 - p$.

We call $[\bar{x} - z_\alpha \sigma_{\bar{X}}, \bar{x} + z_\alpha \sigma_{\bar{X}}]$ as the p -CI for this sample.

Where $z_\alpha = qt(1 - \frac{\alpha}{2}, df = n - 1)$, $qt()$ is quantile for t distribution, df is degree of freedom.

Corollary: The confidence interval is associated with α and sample size n .