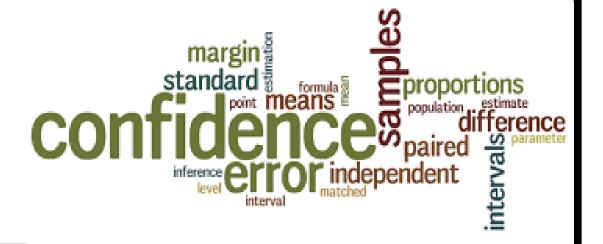
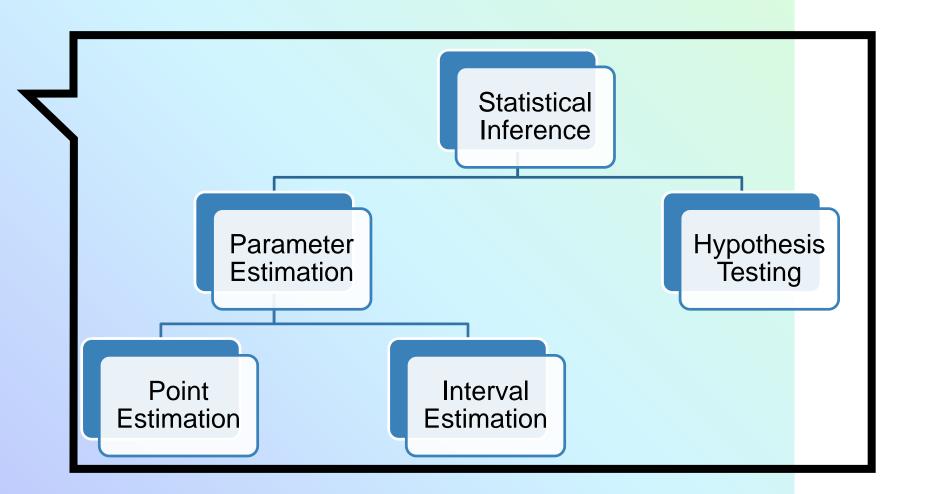
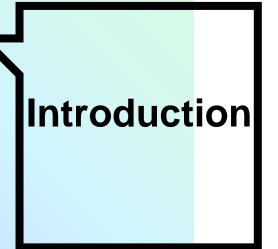
8. STATISTICAL INFERENCE (Part 2) [IT2110]

By Department of Mathematics and Statistics Faculty of Humanities and Sciences, SLIIT

8.2 CONFIDENCE INTERVALS







- Estimates will differ from the true parameter values by varying amounts depending on the samples obtained.
- Point estimates do not convey any measure of reliability.

Interval Estimation

- Interval estimation states that a **population parameter** is **within two values** (an interval) with a **certain probability (Confidence Level)**.
- Interval Estimation is also known as Confidence Interval.

- For a good interval estimate,
 - The probability that the parameter is within the interval should be high.
 - The length of the interval should be small.

A confidence level for the interval should be defined first.

Confidence Level = $1 - \alpha$

where α is the significance level discussed in hypothesis testing.

• Let L and U be the lower and upper confidence limits for a parameter θ based on a random sample $X_1, ..., X_n$. Both L and U are functions of the sample. We can write the interval estimate of θ as,

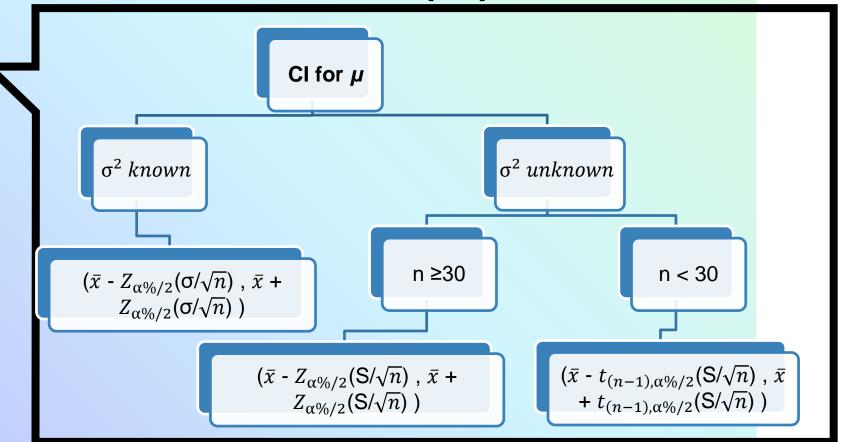
$Pr(L \leq \theta \leq U) = 1-\alpha$

Interpretation:

We are $(1 - \alpha)$ % confident that the true parameter θ is located in the interval (L, U).

 In this session, we will discuss confidence intervals for population mean (μ) only.

Confidence Intervals (CI)



Example:

A company that manufactures cars claims that the gas mileage for its new line of hybrid cars, has a standard deviation of 4 mpg. It was also found out that the mpg was normally distributed. A random sample of 16 cars yielded a mean of 57 miles per gallon. What is the interval estimation for the population mean at a 95% confidence level?

Thanks!

Any questions?

