

#### Model No 4.6: Estimations & Point and interval estimations

Estimation: The judgment made by unknown parameter is called estimation.

(or)

Estimation is a procedure by which numerical values are assigned to parameter based on information collected by samples.

Estimate: A statement made to find an unknown population parameter is called estimate.

Estimator: The procedure or rule, to determine an unknown population parameter is called an estimator.

Example: Sample mean an estimator of population mean be sample mean is a method of determining the population mean.

Note:

1. An estimate must be a static and it must only depends on the sample.
2. A parameter can have one or two or more estimators.

Types of Estimation:

They are two kinds of estimations to determine the static of the population parameters they are

1. Point estimation
2. Interval estimation

1. Point estimation: If an estimate of the population parameter is given by a single values then the estimate is called Point estimation of the parameter.

Example :- The sample mean is a point estimate of the population mean  $\mu$ .

2. Interval estimation: If an estimate of the population is given by two different values between which the parameter may consider to lie. Then the estimate is called interval estimate of the parameter.

Example: We say that a distance is 5.8 kms

In this case we are going to take point estimate.

The distance is in between  $5.28 \pm 0.3$

In this case we are going to take interval estimate.

Important properties of the estimator:

Reliability: A statement of error is known as reliability

Unbiased Estimator: If the mean of sampling distribution of the statistic is equal to the population parameter then the statistic is said to be unbiased estimation of population parameter.

The corresponding value of statistic is there called unbiased estimate of the parameter.

Efficient Estimator:

If the sampling distribution of the statistic with less mean then the statistic with less mean then the statistic with the smaller variance is called a more efficient estimation of the mean.

The corresponding value of the statistic is called an efficient estimate.

Confidence interval: An interval estimate i.e., constructed based on the confidence level is called confidence interval.

Confidence level is denoted by  $(1-\alpha) \times 100\%$ .

$(1-\alpha)$  is called confidence coefficient or degree of coefficient and  $\alpha$  is called significance level. Then confidence coefficient  $1-\alpha=1-0.01=0.99$ . If  $\alpha=0.01$ .

## Unbiased Estimation:

A Statistic  $\hat{\theta}$  is said to be an Unbiased Estimator of the Parameter  $\theta$  i.e.  $E(\hat{\theta}) = \theta$   $E = \text{Expectation}$ .

$$E(Ax+B) = AE(x) + B$$

$$E(100) = 100.$$

$$E(\text{Statistic}) = \text{Parameter}$$

## Efficient Estimation:

If  $\hat{\theta}_1$  &  $\hat{\theta}_2$  are two unbiased estimator of the same Population Parameter  $\theta$  and  $\sigma_{\hat{\theta}_1}^2 < \sigma_{\hat{\theta}_2}^2$  we say that  $\hat{\theta}_1$  is More Efficient Estimator than  $\hat{\theta}_2$ .

## Confidence Level:

