

Statistical Inference (1)

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1- Statistical Inference

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2- Statistical Inference

Second Edition

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1- Point Estimation

Introduction of Estimation

2- properties of good estimator

- Unbiasedness

- Consistency

Mean square error

- Sufficiency

Conditional probability method.

Factorization Criterion.

Exponential Family of distributions

Rao-Blackwell Theorem

- Completeness

- Efficiency

- Minimum Variance - unbiased estimate

3- Methods of Estimation

- Method of Moments

- Maximum Likelihood Method

properties of Maximum likelihood estimation.

التقدير
* Estimation

* Introduction of Estimation

Studying Mathematical Statistics means:

1- Study of the random variables

2- Study of parameter of the probability distributions or population.

المعلمة
* Parameter: A parameter may be defined as unknown constant included in the probability distribution.

الاستدلال الإحصائي
* Statistical Inference: A field of statistics which concerns with study the parameters of probability distributions.

or
Statistical Inference: Is a branch or field of statistics concerns with gathering the information about parameters which are including in the probability distributions.

* The methods are used to study parameters are:

- نظرية التقدير
1- Estimation theory
الفرضيات
2- Testing of Hypothesis.

* Estimation Theory :-

There are two types of estimation that can be done :-

- 1- point estimation .
النقطة التقدير
- 2- Interval Estimation .
الفترة التقدير

It is called a point estimation if a single numerical characteristic can be found from the observations in the sample for the unknown parameter θ .

And it is called interval estimation if a range of numerical characteristic or an interval of values can be found for the unknown parameter in the distribution.

* Random Sample :

Let the random variables $X_1, X_2, \dots, X_n$ be independent and each random variable has the common probability density function $f(x)$. Then the random variables $X_1, X_2, \dots, X_n$ are the form of a random sample (r.s.) of size n from a distribution has probability density function $f(x)$

الإحصاءة

* Statistic :

Any function of the observations $X_1, X_2, \dots, X_n$ (random variables) which does not contain the unknown parameter θ is called statistic.

Ex:

Let $X_1, X_2, \dots, X_n$ be a random sample from a distribution with p.d.f. $f(x; \theta)$, then $\sum_{i=1}^n X_i$, $\bar{X}$, $X_1 + X_2$, $\ln X_1$ are all statistics but $Y = \frac{X - \mu}{\sigma}$ or $Z = X + \mu$ are not statistics because these later functions contains some unknown parameters.

المقدر

التقدير

* Estimator and Estimate:-

Any statistic, $T(X)$, that is used to estimate some functions of the unknown parameter θ , $g(\theta)$, is called an estimator. And the value of that statistic is called an estimate.

As an example we may say $\bar{X}$ is an estimator for the mean μ , but $\bar{x}$ is an estimate for the mean μ . And also S^2 is an estimator of the variance σ^2 , but s^2 is an estimate for the variance σ^2 .