Point Estimation Method rotal point estimations Estimators and Estimaterials bootstand municipal Estimator is a function of random sample X = (x1, x2, ..., xm). Then T(X) is said to be (1) estimator, and the observed values of x ) say (111 (x1,...,xn) is known as estimate. Estimator is used to estimate whe unknown parameteris representations their population mant: It size of signal mobiles parameter Space. Mondonal booksens of month. (0,7) This is the set note all possible values of sime parameters and sits istudenoted by. (1) [] Desired properties of Estimators. 20 min pro 1) Unbfased 1) Consistent (1) Sufficient (Not in syllabus) ny Efficient = T f(x;,e); ee @ Point Estimate 91 15 défined as l'à particuler qualuer of out statistic which. Is used to estimate a given parameter. Point estimation is a singlevalued estimation and is also called the estimation of the parameter. : 31M six 293+8 Ex suppose we want to estimate à true value of the parameternio, say It, i.e., 10=1 by 57 point extination.
Then if we provide a single point for example 1.1 or (0.99) or 0.98 or 1.12. 30, these values are point estimate for 0=1,

Point Estimation Method of point estimation: ) Maximum tikelihood estimation = bus sistemites Estimation of pandom sample say

Method of Moments

(x, x2, ..., xm). Then I(X) is fall to told to II) Least & Squarzenimethodysads out boo . sixtumites (x1)..., is known on estimate. Estimaton is used Likelihoods 29) Function franchest (XigeX2) -- 2011Xm 3 Franks of reandom sample of size in from a population. f(x,0). Then the likelihood function, of the tomasser sample values values values of enoted by L=L(0) Ps their story oint density oresignints pmf and given as lesized properties of Estimators. ( may 1/2 mg + on) = f(x1.0) f(x2.0) . - - f(xn,0)  $= \prod_{i=1}^{n} f(x_{i}, \theta) ; \theta \in \Theta$ The to value of rid , says of 62) infor which people statistic  $\Theta \ni \Phi + \frac{13}{2} \times \frac{1000}{2} \times \frac{1000}{2} \times \frac{0.5}{100} \times \frac$ called bailes of the committee paular estimation of the parameter. ; 31M got equality sulet sunt, x2, x3, iii, xa cid fa, to suggest is 1) First writer the white i hoods function of 0. thing spring f(x,0): f(x,0) -- - of (x,0) of for example 1.1 on (895) \$ 519 = 6071.12. 30, 410050

(2) Toue logarithm of likelihood function (base e).

Sonce log is increasing function so resultant will be same either we maximize L(0) or log L(0). But taking log fwill reduce the calculation difficulties.

 $l = \log L(\theta) = \ln f(x_1, \theta) + \ln f(x_2, \theta) + \dots + \ln f(x_n, \theta)$   $= \sum_{i=1}^{n} r \ln f(x_i, \theta) \qquad \qquad (\cdot \cdot \cdot \ln (x_i x_2 \cdot \dots \cdot x_n)^{\frac{1}{n}})$   $= \ln x_1 + \ln x_2 + \dots + \ln x_n$ 

- 3) Take partial identivative winit. O
- 4) For maxima put Obre o and find the wold value of o in terms of a and check that

Ex Let  $x_1, x_2, \dots, x_n \stackrel{\text{cod}}{\sim} p(\lambda)$ . Find MLE for  $\lambda$ .

$$p(x) = \frac{x!}{x!}$$

$$L(\lambda) = \frac{e^{-\lambda} \lambda^{\chi_1}}{\chi_1!} \cdot \frac{e^{-\lambda} \lambda^{\chi_2}}{\chi_2!} \cdot \frac{e^{-\lambda} \lambda^{\chi_2}}{\chi_n!}$$

$$l = L(\lambda) = \prod_{i=1}^{n} \frac{e^{\lambda} \lambda^{x_i}}{x_i!} = e^{-n\lambda} \lambda^{x_i} \prod_{i=1}^{n} \frac{1}{x_i!}$$

Next, take bothisher o miliaged ever (4) modulant 2 - my to ( ) and the sound at 1 million to the 1 million to the sound at 1 million to the sound at 1 million to ("Next take" paintial "diff. follwright to (0) ] for 如代 [cultics.  $\frac{\partial \ln L}{\partial \lambda} = -n + \frac{2\pi}{100} + 0$   $L = \log L(e) = \ln f(a_0 a_0 A_1 a_0) + (a_0 a_0 A_2 a_0) + (a_0 a_0 A_3 a_0) + (a_0 a_0 A$ For maxima, =0  $\Rightarrow -n + \frac{1}{23} = 0$ 3) Take partial menivative wind.  $\sum_{(0,x)} \frac{\lambda}{n} = \sum_{i=1}^{x} \frac{\lambda_i}{0} = \frac{1}{x} \frac{\lambda_i}{\lambda_i}$ Now,  $\vec{x} = \vec{x}$  and  $\vec{x} = \vec{x}$  and  $\vec{x} = \vec{x}$ . And  $\vec{x} = \vec{x}$  work value of  $\vec{x} = \vec{x}$  and  $\vec{x} = \vec{x}$  and  $\vec{x} = \vec{x}$  and  $\vec{x} = \vec{x}$ . Thung  $\hat{\lambda} = \bar{\chi}$  for MLE > for  $\lambda$ .  $\hat{\theta} = \theta(\alpha)$  is MLE for  $\theta$ . Let X, X2, ..., X, P(A). Find NILE for A.  $\frac{\sqrt{3}x}{13} = (x)d$  $\frac{1}{100} = \frac{1}{100} = \frac{1}$ 13x (=3 (A) = 2 (A) = 2.