Next Item

Consider $X_1, \ldots, X_n$, $n \in \mathbb{N}$, independently and identically distributed random variables with probability density and cumulative distribution function, respectively, given by

$$f(x;\alpha,\gamma) = \begin{cases} \alpha\gamma^{\alpha}x^{-(\alpha+1)}, & \gamma \le x, \\ 0, & \text{else}, \end{cases} \quad , \quad F(x;\alpha,\beta) = \begin{cases} 1-\gamma^{\alpha}x^{-\alpha}, & \gamma \le x \\ 0, & \text{else} \end{cases} \qquad (1)$$

with real parameters $\alpha > 1, \gamma > 0$; that is, the (full) likelihood of the parameters for a sample $\boldsymbol{x} = (x_1, \ldots, x_n)$ is given by

$$L(\alpha,\gamma;\boldsymbol{x}) = \begin{cases} \alpha^n\gamma^{n\alpha}\prod_{i=1}^n x_i^{-(\alpha+1)}, & \gamma \le x_{(1)}, \\ 0, & \text{else}, \end{cases}$$

where $x_{(1)} = \min\{x_1, \ldots, x_n\}$ denotes the minimum of the observed sample values.

Consider the profile likelihood approach, where γ is the nuisance parameter, while α is the parameter of interest. Denote by $\hat{\gamma}(\alpha)$ the nuisance parameter estimate of γ for fixed α.

Suppose we have observed the sample

$$x_1 = 6, x_2 = 4, x_3 = 3$$

of size $n = 3$.

Find the missing numerical values with a precision of two decimals. **2 of 2 points**

1 of 1 point

(a) Calculate $\hat{\gamma}(\alpha)$ and give the value of $\hat{\gamma}(\alpha)$ for $\alpha = 2$.

3 ✓

1 of 1 point

(b) Calculate the profile maximum likelihood estimate for the parameter α based on the observed sample given above (with a precision of two decimals).

$\hat{\alpha}^{profile} =$

3.06 ✓

Next Item

Create an inspection request?

Please note that this document will become a part of your exam file!
- Be polite and friendly.
- Describe your rationale as precisely as possible.

Dynexite, 30.07.2021

Request for correction of this item

Dear sir or madam, ...

(This document is valid without signature)

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OVERVIEW

LEAVE INSPECTION