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NPTEL

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Unit 13 - Week 11

Register for Certification exam

Course outline

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- Lecture 65 : Basic Definitions
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- Lecture 69 : Applications of N-P lemma II
- Quiz : Assignment 11

Assignment 11

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-04-17, 23:59 IST.

1) *1 point*

Let $X_1,\ldots,X_n$ be a random sample from $N(0,\sigma^2)$, where σ^2 is a unknown. The MP tes

$H_1:\sigma^2=\sigma_0^2$ vs. $K_1:\sigma^2>\sigma_0^2$ is

a. Reject H_1 if $\dfrac{\sum_{i=1}^{n} X_i^2}{\sigma_0^2} \geq \chi^2_{n,\alpha}$

b. Reject H_1 if $\dfrac{\sum_{i=1}^{n} X_i^2}{\sigma_0^2} \leq \chi^2_{n,\alpha}$

c. Reject H_1 if $\dfrac{\sum_{i=1}^{n} X_i^2}{\sigma_0^2} \geq \chi^2_{n,1-\alpha}$

d. Reject H_1 if $\dfrac{\sum_{i=1}^{n} X_i^2}{\sigma_0^2} \leq \chi^2_{n,1-\alpha}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

2) *1 point*

Let $X_1,\ldots,X_n$ be a random sample from a $N(\mu,1)$ population. Consider the hypot

$H_1:\mu=0$ vs. $K_1:\mu>0$. A random sample of size five from this population is: 1.4, 2.4, 4.2,

and -1.2 . Based on this sample which of the following decisions is valid for an MP test of

0.05?

a. Reject H_1

b. Accept H

Assignment Solution

c.

d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

3) *1 point*

In testing a hypothesis H_1 against an alternative K_1, the probability of type I error is defined a

a. $P(\text{Rejecting } H_1 \text{ when } H_1 \text{ is true})$
b. $P(\text{Rejecting } H_1 \text{ when } K_1 \text{ is true})$
c. $P(\text{Accepting } H_1 \text{ when } H_1 \text{ is true})$
d. $P(\text{Accepting } H_1 \text{ when } K_1 \text{ is true})$

a.

b.

c.

d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

4) *1 point*

Let the null hypothesis be that the alleged culprit is innocent and the alternative hypothes that he/she is criminal. If the judge wrongly pronounces the alleged culprit to be criminal, the error committed by the judge is

a. Type I error
b. Type II error
c. Sampling error
d. None of the above

a.

b.

c.

d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

5) *1 point*

Let $X_1,\ldots,X_n$ be a random sample from a $N(\mu,1)$ population. Consider the hypot $H_1: \mu=\mu_0$ vs. $K_1: \mu=\mu_1$, where $\mu_1>\mu_0$. The MP test at level $\alpha=0.05$ is to Reject H_1 if

a. $\bar{X} \geq \mu_0 + \dfrac{1.96}{\sqrt{n}}$

b. $\bar{X} \leq \mu_0 + \dfrac{1.96}{\sqrt{n}}$

c. $\bar{X} \geq \mu_0 + \dfrac{1.64}{\sqrt{n}}$

d. $\bar{X} \leq \mu_0 + \dfrac{1.64}{\sqrt{n}}$

a.

b.

c.
d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

6) **1 point**

Let $X_1,\ldots,X_n$ be a random sample from an exponential distribution

$$f(x,\theta)=\begin{cases}\theta e^{-\theta x}, & x\ge 0,\ \theta>0\\ 0, & otherwise\end{cases}$$

Consider the hypothesis $H_1:\theta=1$ vs. $K_1:\theta=2$. Then the MP test is : Reject H_1 if

a. $2\sum_{i=1}^{n}X_i \ge \chi^2_{2n,\alpha}$

b. $2\sum_{i=1}^{n}X_i \le \chi^2_{2n,1-\alpha}$

c. $2\sum_{i=1}^{n}X_i \ge \chi^2_{n,\alpha}$

d. $2\sum_{i=1}^{n}X_i \le \chi^2_{n,1-\alpha}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

7) Which among the following is always a correct statement? **1 point**

a. Power increases then Type I error decreases.
b. Power increases then Type II error decreases.
c. Power decreases then Type I error decreases
d. Power decreases then Type II error decreases

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

8) **1 point**

Let X be a single observation from the population

$$f(x,\theta)=\begin{cases}\theta e^{-\theta x}, & x\geq 0,\ \theta>0\\ 0, & otherwise\end{cases}.$$

If $X>1$ is a critical region for testing $H_1:\theta=1$ vs. $K_1:\theta=2$, find the Type I error.

a. e
b. $e-1$
c. $1-e$
d. e^{-1}

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

9) In Question 8, find the power of test. *1 point*

a. e^{-1}
b. e^{-2}
c. $2e^{-2}$
d. $1-e^{-2}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

10) *1 point*

Let $X\sim Bin(n,p)$, where is known and $0<p<1$. In order to test $H_1:p=\frac{1}{2}$ vs. $K_1:\ p=\frac{3}{4}$

a test is : Reject H_1 if $X\geq 2$. Find the power of the test.

a. $\frac{1+3n}{4^n}$
b. $\frac{1-3n}{4^n}$
c. $1-\left(\frac{1+3n}{4^n}\right)$
d. $1-\left(\frac{1-3n}{4^n}\right)$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

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