Domanda 1

Risposta corretta

Punteggio ottenuto 1,00 su 1,00

Contrassegna domanda

Let X be a random variable following a Normal distribution with mean = -5.01 and variance = 3.52, what is the probability that $X > -3.44$?

Scegli un'alternativa:

- a. pnorm(-3.44, -5.01, 1.88, lower.tail = FALSE); 0.20 ✓ True
- b. pnorm(-3.44, -5.01, 3.52, lower.tail = TRUE); 0.67
- c. pnorm(-3.44, -5.01, 3.52, lower.tail = FALSE); 0.33
- d. pnorm(-3.44, -5.01, 1.88, lower.tail = TRUE); 0.80

a. True
b. False
c. False
d. False

La risposta corretta è: pnorm(-3.44, -5.01, 1.88, lower.tail = FALSE); 0.20

Domanda 2

Risposta errata

Punteggio ottenuto -0,33 su 1,00

Contrassegna domanda

The interval $(\hat{\theta} - z_{1-\alpha/2}\sqrt{V(\hat{\theta})}; \hat{\theta} + z_{1-\alpha/2}\sqrt{V(\hat{\theta})})$ for the parameter θ of a statistical model is obtained, where $z_{1-\alpha/2}$ is the $1-\alpha/2$ quantile of a standard normal distribution. Which of the following sentences is true:

Scegli un'alternativa:

- a. The probability that such a random interval contains the value θ is 1-α.
- b. The parameter θ is not contained in the interval with probability $1-\alpha$.
- c. The parameter θ is contained in the interval with probability $1-\alpha$. ✗ FALSE
- d. The interval obtained is larger if the value α is larger.

a. TRUE
b. FALSE
c. FALSE
d. FALSE

La risposta corretta è: The probability that such a random interval contains the value θ is 1-α.

Domanda 5

Risposta corretta

Punteggio ottenuto 1,00 su 1,00

Contrassegna domanda

The asymptotic distribution for the MLE (maximum likelihood estimator) for a binomial distribution with parameter p is:

Scegli un'alternativa:

a. $\hat{p} \sim \mathcal{N}\left(0, \frac{p(1-p)}{n}\right)$

b. $\hat{p} \sim \mathcal{N}\left(p, \frac{p(1-p)}{n}\right)$ ✓ TRUE

c. $\hat{p} \sim \mathcal{N}(p, p(1-p))$

d. $\hat{p} \sim \mathcal{N}(p, np(1-p))$

a. FALSE
b. TRUE
c. FALSE
d. FALSE

La risposta corretta è: $\hat{p} \sim \mathcal{N}\left(p, \frac{p(1-p)}{n}\right)$

Domanda 6

Risposta corretta

Punteggio ottenuto 1,00 su 1,00

Contrassegna domanda

Given a sample $y = (y_1, y_2, \ldots, y_{10})$ from a $\mathcal{N}(\mu, \sigma^2)$, we want to test the null hypothesis $H_0 : \mu = 0$ against the alternative $H_1 : \mu \neq 0$ at level $\alpha = 0.05$. Suppose we find: $t_{obs} = \sqrt{10}\,\bar{y}/s = 4.72$. Then, which is the right R code to compute the test's p-value?

Scegli un'alternativa:

a. 1-pt(q=4.72, df = 9, lower.tail = FALSE)

b. pt(q=4.72, df = 10, lower.tail = TRUE)

c. 2*pt(q=4.72, df = 9, lower.tail = FALSE) ✓ TRUE

d. dt(x=4.72, df = 9)

a. FALSE
b. FALSE
c. TRUE
d. FALSE

La risposta corretta è: 2*pt(q=4.72, df = 9, lower.tail = FALSE)

Domanda 4

Risposta corretta

Punteggio ottenuto 1,00 su 1,00

Contrassegna domanda

Consider the following random sample of 14 cats that collects their weight in kilograms

```
c(4.31, 5.19, 3.37, 4.42, 4.82, 4.02, 5.62, 5.47, 4.38, 6.38,
3.97, 5.85, 5.35, 5.81)
```

Assume that the random variable weight of cats follows a Normal distribution with mean μ, compute the observed significance level to verify the following hypotheses:

H0:$\mu \geq 5$
H1:$\mu < 5$

```
> n <- length(cat)
> stat.test.H0 <- (mean(cat)-5)/sqrt(var(cat)/n)
> stat.test.H0
```

```
[1] -0.3188786
```

Scegli un'alternativa:

- a. pt(stat.test.H0, df = n-1) ✓ TRUE
- b. pnorm(stat.test.H0)
- c. pt(stat.test.H0, df = n-1, lower.tail = FALSE)
- d. pnorm(stat.test.H0, lower.tail = FALSE)

a. TRUE
b. FALSE
c. FALSE
d. FALSE

La risposta corretta è: pt(stat.test.H0, df = n-1)

Domanda 3

Risposta corretta

Punteggio ottenuto 1,00 su 1,00

Contrassegna domanda

The following code computes:

```
> R <- 1000
> n <- 10
> p <- 0.5
> alpha <- 0.01
> TF <- c()
> for(i in 1:R){
+   p.hat <- mean(rbinom(n,1,p))
+   TF[i] <- (p.hat + qnorm(alpha/2)*sqrt(p.hat*(1-p.hat)/n) < p &
+             p.hat + qnorm(1-alpha/2)*sqrt(p.hat*(1-p.hat)/n) > p)
+ }
> mean(TF)
```

Scegli un'alternativa:

- a. the nominal level of a confidence interval
- b. the empirical coverage of a confidence interval ✓ TRUE
- c. an estimate of the parameter of interest p
- d. the margin of error of a confidence interval

a. FALSE
b. TRUE
c. FALSE
d. FALSE

La risposta corretta è: the empirical coverage of a confidence interval