بانکی پرسیار(Question Bank) لە بابەتی نظرية التقدير (کورسی دووەم) سالی خویندنی 2022-2023

Q1// Let $X_1, X_2, \ldots, X_n$ denote a random sample from Bernoulli dist^n Ber(θ), find the m.l.e for θ.

Q2// Let $X_1, X_2, \ldots, X_n$ denote a random sample from Poisson dist^n Poi(θ), find the m.l.e for θ.

Q3// Let $X_1, X_2, \ldots, X_n$ be a rss*n* from normal dist^n N(θ, 1), find the m.l.e for θ.

Q4// Let $X_1, X_2, \ldots, X_n$ be a rss*n* from Binomial dist^n Bin(m, θ), find the m.l.e for θ.

Q5// In a rss*n* from exponential dist^n Exp($1/\theta$), find the m.l.e for:

1) $u_1(\theta) = \frac{1}{\theta}$ 2) $u_2(\theta) = \frac{\ln(\theta)}{\theta}$

Q6// In a rss*n* from exponential dist^n Exp(θ), find the m.l.e for θ:

Q7// In a rss*n* from Geometric dist^n Geo(θ), with p.d.f ; $f(x;\theta) = \theta(1-\theta)^{x-1}$, $x = 1,2,\ldots..$, find the m.l.e for θ:

Q8// In a rss*n* from Geometric dist^n Geo(θ), with p.d.f ; $f(x;\theta) = \theta(1-\theta)^{x}$, $x = 0,1,2,...$, find the m.l.e for θ:

Q9// In a rss*n* taken from a dist^n with p.d.f ; $f(x;\theta) = e^{-(x-\theta)}$, $\theta \leq x < \infty$, find the m.l.e for θ.

Q10// Let $X_1, X_2, \ldots, X_n$ be a rss*n* from normal dist^n N(θ, σ^2), **1)** find m.l.e for parameters θ and σ^2. **2)** If S^2 is m.l.e. for σ^2, then find m.l.e. for σ.

Q11// Let $X_1, X_2, \ldots, X_n$ be a rss*n* from normal dist^n N(θ, σ^2), estimate the parameters θ and σ^2 using moment method.

Q12// In a rss*n* from a dist^n with p.d.f.; $f(x;\theta) = (\theta+1)\, x^{\theta}$, $0 < x < 1$, estimate the parameter θ using moment method.

Q13// Estimate the parameters of $\Gamma(\alpha, 1/\theta)$, using moment method.

Q14// Estimate the parameter by using moment method for:

1) Ber(θ). **2)** Exp($1/\theta$). **3)** Geo(θ).

Q15// Find an estimate the parameter θ from; $f(x;\theta) = \theta\, x^{\theta-1}$, $0 < x < 1$, by using moment method.

Q16// In a rssn, find m.v.e. for the parameters of; **1)** Ber(θ). **2)** N(θ, σ^2).

Q17// In a rssn, find m.v.e. for the parameters of; **1)** Poi(θ). **2)** Bin(m, θ).

Q18// Find Bayes estimator for parameter of; **1)** Ber(θ). **2)** Poisson(θ), using non informative prior probability.

Q19// Find Bayes estimator for parameters of; **1)** Exp($1/\theta$), **2)** N(θ, σ^2) , using non informative prior probability.

Q20// : Estimate the parameters of; **1)** Geo(θ). **2)** Poisson (θ). **3)** Exp(θ). **4)** N(θ, σ^2) (θ known) and (σ^2 known)., using Bayesian informative prior probability.

Q21// In arss100 taken from normal dist^n with mean θ and variance ($\sigma^2 = 225$), and found that $\overline{X}$ of the sample is (125). Find (95%) confidence interval for θ.

Q22// Let $X_1, X_2, \ldots, X_9$ be a rss9 from a distribution with mean θ and variance σ^2, and

($\overline{X} = 19.74$, $S^2 = 0.65$). Find (99%) confidence interval (CI) for θ.

Q23// A rss(50) taken from normal population with mean (θ) and variance σ^2, and ($\overline{X} = 5.67$, S = 1.94). Find (95%) confidence interval (CI) for θ.

Q24// An epidemiologist studied the blood glucose level of a random sample of 100 patients. The mean was 170, with a SD of 10. Find (95%) confidence interval for θ.

Q25// Let $\overline{X}$ be a sample mean for a rss15 from a normal population with mean μ_X and known variance $\sigma_X^2 = 60$ and $\overline{Y}$ be a sample mean for a rss18 from a normal population with mean μ_Y and known variance $\sigma_Y^2 = 40$, we find that $(\overline{X} = 70.1)$, $(\overline{Y} = 75.3)$, find 90% CI for $(\mu_X - \mu_Y)$.

Q26// Let $X_1, X_2, \ldots, X_{20}$ be a random sample from normal population with unknown mean, and unknown variance, we found that $(\overline{X} = 76.1$, $S^2 = 88.36)$, find 99% CI for σ^2.

Q27// Let

$X \sim N(\theta_X , \sigma_X^2)$, $Y \sim N(\theta_Y , \sigma_Y^2)$

$n = 10$, $\overline{X} = 4.2$, $\sigma_X^2 = 49$

$m = 7$, $\overline{Y} = 3.4$, $\sigma_Y^2 = 32$

Find 90 % CI for ($\theta_X - \theta_Y$).

Q28// from N(θ, σ^2), we have ($n = 9$, $S^2 = 7.63$), find 95 % CI for σ^2.

Q29// Let $X_1, X_2, \ldots, X_n$ be a rssn from Poisson dist^n;

$f(x;\theta) = e^{-\theta}\ \theta^x\ /\ x!$

$H_o : \theta = \theta_o$, $H_1 : \theta = \theta_1$, $Find:\ C_o$?

Q30// Let $X_1, X_2, \ldots, X_n$ be a rssn from N(θ, 1). Find the best critical region (B.C.R) to test H_o: $\theta = 0$, H_1: $\theta = 1$, ($\alpha = 0.05$)

Q31// Let $X_1, X_2, \dots, X_n$ be a rssn from $f(x)$. Find the best critical region (B.C.R) to test;

$$H_o : f(x) = \frac{e^{-x}}{x!} \quad , \quad x = 0, 1, 2, 3, \dots$$

$$H_1 : f(x) = \left(\frac{1}{2}\right)^{x+1} \quad , \quad x = 0, 1, 2, 3, \dots$$

$H_o: \theta = 0$, $H_1: \theta = 1$, $(\alpha = 0.05)$

Q32// Let $X_1, X_2, \dots, X_n$ denote a rssn from a dist^n having the p.d.f.

$$f(x;\theta) = \theta^x (1-\theta)^{1-x} \quad , \quad x = 0,1$$

Show that $C = \left\{(x_1, x_2, \dots, x_n) : \sum_{i=1}^{n} x_i \le c\right\}$ is the best critical region for testing

$$H_o : \theta = \frac{1}{2} \text{ aganst } H_1 : \theta = \frac{1}{3}$$

Use the central limit theorem to find n and c so that approximately

$$\Pr\left(\sum_{i=1}^{n} X_i \le c : H_o\right) = 0.10 \text{ and } \Pr\left(\sum_{i=1}^{n} X_i \le c : H_1\right) = 0.80$$

Q33// Let $X_1, X_2, \dots, X_n$ be a rssn from N(0, θ).

Let; $H_o: \theta = \theta_o$, $H_1: \theta > \theta_o$, Find the U.M.P.T.

Q34// Let $X_1, X_2, \dots, X_n$ be a rssn from N(θ, 1).

Let: $H_o : \theta = \theta' = 0$, $H_1 : \theta = \theta'' = -1$,

$\bar{x}$, $n = 25$, $\alpha = p(\theta') = 0.05$, $p(\theta'') = 0.999$ Find the U.M.P.T. Or find the critical region (C)?

Q35// Let $X_1, X_2, \dots, X_n$ be a rssn from N(0, σ^2).

Let; $H_o: \sigma^2 = 1$, $H_1: \sigma^2 = 2$, n = 10 , Find the Best C.R.?

Q36// Let $X_1, X_2, \dots, X_n$ be a rssn from N(θ_1, θ_2), where $(-\infty < \theta_1 < \infty \ , \ \theta_2 > 0)$

Let; $H_o : \theta_1 = 0 \ , \ \theta_2 > 0$, $H_1 : \theta_1 \neq 0 \ , \ \theta_2 > 0$.

Q37// Let $Y_1 \le Y_2 \le Y_3 \le Y_4$ is order statistic, and $y_4 \le 1/2$ *or* $y_{4 \ge 1}$

$f(x;\theta)=\frac{1}{\theta}$, and let; $H_o:\theta=1$, $H_1:\theta\neq 1$. Find $K(\theta)$?

Q38// Let $N_1(\mu_1, 400)$, $N_2(\mu_2,225)$, and let $\theta = \mu_1 - \mu_2$,

$H_o:\theta=0$ $\quad\quad \bar{x}-\bar{y}\geq c$

$H_1:\theta>0$ $\quad\quad$ *Find* (n) *and* c?

α = K(0) = 0.05 , K(10) = 0.90