Question Bank: (Statistical Inference)

Q_1/ In a r.s.s.n from Exp($1/\theta$), let $Y_1 < Y_2 < \ldots < Y_n$ be the order statistics of this sample. Find: $g(y_2)$, $g(y_{n-1})$ and when ($n = 4$) Find $g(y_1, y_3)$.

Q_2 / In a r.s.s.n from normal dist^n N(θ, σ^2), show that: $S^2 = \frac{1}{n}\sum(X_i - \overline{X})^2$ is consistent estimator for σ^2. (Using Chebycheve inequality)

Q_3 / If X be a random variable from Poisson dist^n. , Show that the family of X is complete.

Q_4/ Show that $\hat{\theta} = Y_n$ is consistent estimator for θ from C.U(0 , θ), (by theorem).

Q_5/ In a rss$n$. Find minimal sufficient estimators for θ from $\Gamma(2$, $\theta)$.

Q_6/ If X be a random variable from Bernoulli dist^n. ,Show that the family of X is complete.

Q_7/ In a random sample of size (n) from normal dist^n N(θ, σ^2). Is $S^2 = \frac{1}{n}\sum(X_i - \overline{X})^2$ unbiased in limit estimator for the parameter (σ^2).

Q_8 / In a rss$n$ from Geometric dist^n Geo(θ), show that $\overline{X}$ is consistent estimator for the parameter θ.   (Using Chebycheve inequality)

Q 9/ In a rssn from a dist^n with p.d.f.: $f(x;\theta) = e^{2\theta - x}$, $x \geq 2\theta$,

show that Y_1 is sufficient estimator for the parameter θ. (Using Conditional Method)

Q 10 / In a rssn from Poisson dist^n poi(θ). Show that $Y = \sum X_i$ is a complete sufficient estimator for θ. Find the unique continuous function of Y which is the best estimator for θ (M.V.U.E).

Q 11 / In a rssn from exponential dist^n Exp(θ), show that: if $T = \overline{X}$ is an efficient estimator for $\phi(\theta) = \theta$.

Q 12 / In a rss2 from Bernoulli dist^n Ber(θ), let $T_1 = X_1$ and $T_2 = \dfrac{\sum X_i}{n + 1}$ be two estimators for parameter θ, show that which of them more efficient.