

逢甲大學九十二學年度碩士班甄試入學考試試題

科目	統計(含機率)	適用系所	統計與精算研究所碩士班	時間	一〇〇分鐘
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※請務必在答案卷作答區內作答。

- For a random sample from the Poisson distribution with mean λ .
 - Find an unbiased estimator of $\tau(\lambda) = (1 + \lambda)e^{-\lambda}$.(5%)
 - Find a maximum-likelihood estimator of $\tau(\lambda)$.(5%)
 - Find the UMVUE of $\tau(\lambda)$.(5%)
- Let X_1, X_2, \dots, X_n be a random sample of size n from a normal density with known variance. What is the best critical region for testing the null hypothesis that the mean is 6 against the alternative that the mean is 4?(10%)
- Assume that Y_1, Y_2, \dots, Y_n are independent normal random variables with means $\beta_0 + \beta_1 x_1, \beta_0 + \beta_1 x_2, \dots, \beta_0 + \beta_1 x_n$ and variances σ^2 .
 - Use the method of maximum likelihood to find point estimators of β_0, β_1 , and σ^2 .(9%)
 - Construct a α -level confidence interval for σ^2 .(6%)
- Let the p.d.f. $f(x)$ be positive at $x = -1, 0, 1$ and zero elsewhere.
 - If $f(0) = 1/4$, find $E(X^2)$.
 - If $f(0) = 1/4$ and if $E(X) = 1/4$, determine $f(-1)$ and $f(1)$.
- Let X have the p.d.f. $f(x) = 3x^2, 0 < x < 1$, zero elsewhere. Consider a random rectangle whose sides are X and $(1-X)$. Determine the expected value of the area of the rectangle.
- Let $f(x_1, x_2) = 21x_1^2 x_2^3, 0 < x_1 < x_2 < 1$, zero elsewhere, be the joint p.d.f. of X_1 and X_2 .
 - Find the conditional mean and variance of X_1 , given $X_2 = x_2, 0 < x_2 < 1$.
 - Find the distribution of $Y = E(X_1 | X_2)$.
 - Determine $E(Y)$ and $\text{var}(Y)$ and compare these to $E(X_1)$ and $\text{var}(X_1)$, respectively.