逢甲大學96學年度碩、博士班甄試入學試題

科目	數理統計（含迴歸分析）	適用系所	應用統計研究所博士班	時間	一〇〇分鐘

※請務必在答案卷作答區內作答。　　共 1 頁第 1 頁

1. (20%) Suppose that (X,Y) has a joint cumulative distribution function given as $F(x,y)=1-e^{-x}-e^{-y}+e^{-(x+y+\theta xy)}$ where $x,y>0,\ 0\le\theta\le 1$. Find the joint probability density function $f(x,y)$ and the conditional density function of Y given X.

2. (15%) Let $X_1,...,X_n$ be a random sample from the Poisson distribution, find an unbiased estimator of $\tau(\lambda)=(1+\lambda)e^{-\lambda}$. Find a maximum likelihood estimator of $\tau(\lambda)$. Find the UMVUE of $\tau(\lambda)$.

3. (15%) Let $X_1,...,X_n$ be a random sample from $f(x;\theta)=(1/\theta)x^{(1-\theta)/\theta}I_{(0,1)}(x)$

   Find a uniformly most powerful size-α test of $H_0:\theta\le\theta_0$ versus $H_1:\theta>\theta_0$ if such exists. Sketch the power function of the UMP test when n=2, $\theta_0=1$, and $\alpha=0.05$.

4. (10%) What is "multicollinearity" in regression model? How to detect it?

5. (20%) State the details of "forward regression method" and "backward regression method". Moreover, state the advantages for both methods, respectively.

6. (20%) State the basic assumptions in the regression model. How to test the independence of the white noises?