國立中央大學八十八學年度碩士班研究生入學試題卷

所別: 資訊管理研究所 甲乙組 科目: 統計學 共 2 頁 第 1 頁

一、A study is designed to test the scientific hypothesis: "student government leaders have higher IQs than the average college students". The null and alternative hypotheses are:

H_0: $\mu <= 115$ H_1: $\mu > 115$

A random sample of 100 student government leaders has been obtained from the population of leaders at Taiwan's colleges and that the mean IQ of this sample is 117, standard deviation is 15, the significance level is set at 0.05.

1. Compute and state your decision regarding to the hypothesis. (5 %)
2. Suppose the sample mean is 117.47 and also assume that the population mean of student government leaders' IQs is equal to 118, calculate the probability to make a type II error and power. (10 %)
3. Describe first the meaning of "power", "type I error" and "type II error" and then state the relationships among them . (10%)

二、For analysis of variance (ANOVA), why do we always put MST in the numerator and MSE in the denominator of the F ratio? (6 %) (說明 : MST 表 mean square of treatment; MSE 表 mean square of error)

三、For a particular set of data, $Y_{ij} = \mu + \alpha_j \times e_{ij}$. What ANOVA assumption has been violated? (4 %)

四、說明分配曲線的偏態(skewness) 和峰態(kurtosis) 的意義與重要性。(10%)

五、在足夠大的抽樣樣本的情況下，母體變異數的不偏估計量爲何? 並證明之。 (10%)

六、在哪些考量下我們才可依據較大的樣本相關係數(coefficient of correlation)數值，例如 0.92 或 0.89 等數值，來推論某兩個變數間高度相關？(10%)

七、Suppose that 10%of the population are carriers of a certain genetic trait. A new test has been developed to help identify trait carriers; however, the test is imperfect: If someone has the trait, then the probability is 0.95 that the test will be positive (indicating the trait). Furthermore, if someone does not have the trait, then the probability is 0.04 that the test will be positive. Find the probability that someone has the trait if the test is positive. (10%)

八、An automobile financing corporation wishes to learn whether marital status has any bearing on whether a new car loan becomes delinquent within the first year. A random sample of 950 approved financing applications is summarized in the following table. Test the assumption that married and unmarried borrowers are equally likely to become delinquent, using $\alpha = 0.10$. (10%)

Marital Status	Number of Loans Sampled	Number Delinquent in year 1
Unmarried	413	29
Married	537	47

九、

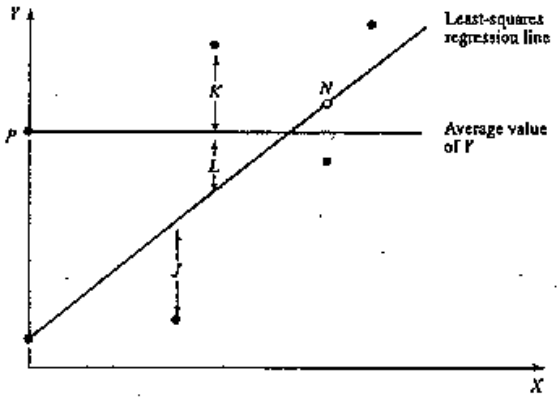
1. Refer to the following Figure. Identify the letter – J ,K,L,N,P – that corresponds to each of the following terms: (10%)

   a) Error variability b) Predicted value of Y c) Regression variability

   d) Total variability e) $\overline{Y}$

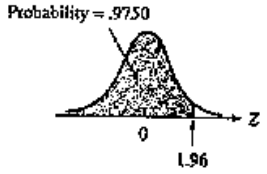
2. State, in words, the meaning of the coefficient of determination R^2. (5%)

FIGURE Generic Scatter Plot Illustrating Regression Concepts



參考用

APPENDIX C The Z-Table



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7703	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998