國立中央大學九十學年度碩士班研究生入學試題卷

所別: 資訊管理學系 甲乙組 科目: 統計學 共 2 頁 第 1 頁

一、資料的衡量尺度可分爲幾種？試分別說明之，並舉例比較其差異性。(10%)

二、(a).何謂判定係數(coefficient of determination)？試說明當判定係數爲 0 或爲 1 時，其含義爲何？(5%)

(b).何以需要有修正複判定係數？請說明之。(5%)

三、光源製鞋廠隨機抽取 N 件成品，令 X 表其中有瑕疵的件數，p 表工廠生產鞋子有瑕疵的機率，已知 X 的平均數爲 92，標準差爲 9.2，問 (1) X 呈何種分配？並寫出其機率函數。(2) 求 p 與 N 之值。(10%)

四、空氣抽樣實驗進行 27 次，並觀察實驗中的 4 個預測變數 x_1、x_2、x_3 與 x_4 以及反應變數 y 之值，對由此實驗所搜集到的資料配適一線性複迴歸模式。結果如下：(20%)

$\hat{\beta}_0 = -8.51$, $\hat{\beta}_1 = 2.37$,

$\hat{\beta}_2 = 20.2$, $\hat{\beta}_3 = -0.828$, $\hat{\beta}_4 = 5.91$

迴歸平方和 SSR = 925.50, 誤差平方和 SSE =82.86

(a) 就下列各種情形，預測 y 值： (1) x_1=16, x_2=0.5, x_3=5, x_4=4.6

(2) x_1=25, x_2=0.8, x_3=1, x_4=2.3

(b) 以此配適的迴歸模式，解釋 y 變異的百分比爲何？

(c) 設 $\hat{\beta}_1$ 與 $\hat{\beta}_2$ 標準誤估計值分別爲 0.062 與 2.51，求 β_1 之 90%信賴區間。

(d) 以 α =0.05，檢定 H_0： β_2=25 對 H_1： β_2<25。

五、那些因素會影響假說檢定時的檢定力(power 1- β of test)？如何影響？(10%)

六、進行統計假說檢定，其結果接受(不拒絕)某一假說時，是否表示該假說一定真實？當拒絕某一假說時，是否表示該假說一定錯誤？試說明之。(10%)

七、A sample of size n=200 observations is randomly selected from a population consisting of 12 million observations with a mean μ=6 and variance σ^2 =81. (10%)

(a) What is the probability that the sample value of $\bar{x}$ is greater than or equal to 7 ?

(b) If the size of the population were 1200 rather than 12 million, what is the probability that the sample mean $\bar{x}$ is greater than or equal to 7 ?

八、Independent random samples drawn from each of two populations produced the following sample information: (10%)

Sample 1: n_1=160, $\bar{x}_1$=98, s_1=16.6

Sample 2: n_2=180, $\bar{x}_2$=96, s_2=17.2

The experimenter wishes to determine whether there is a difference between the two population means.

(a) Is this a one- or a two-tailed test?

(b) Locate the rejection region for the test (α = 0.05) and calculate the value of the test statistic.

(c) Do the data support rejection of the null hypothesis? Use α = 0.05.

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九、A consumer preference study involving there different package designs (treatments) was laid out in a randomized block design among four supermarkets (blocks). The data shown in the following table represent the number of units sold for each package design within each supermarket during each of three given weeks. (10%)

	Supermarkets				
Design	1	2	3	4	Totals
1	17	15	1	6	39
2	34	26	23	22	105
3	23	21	8	16	68
totals	74	62	32	44	212

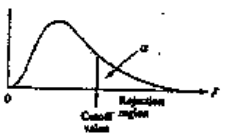
(a) Complete the ANOVA table.

Source	SS	df	MS	F
Treatments	547.1667			
Blocks	348.0000			
Error				
Total	940.6667			

(b) Do the data present sufficient evidence to indicate a difference in the mean sales for each package design? Use $\alpha = 0.05$.

(c) Do they present sufficient evidence to indicate a difference in mean sales for the supermarkets? Use $\alpha = 0.05$.

APPENDIX F F-Distribution Cutoff Values

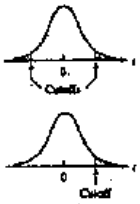


Numerator df

Denominator df	α	1	2	3	4	5	6
1	.10	39.86	49.50	53.59	55.83	57.24	58.20
	.05	161.4	199.5	215.7	224.6	230.2	234.0
	.01	4052	5000	5403	5625	5764	5859
2	.10	8.53	9.00	9.16	9.24	9.29	9.33
	.05	18.51	19.00	19.16	19.25	19.30	19.33
	.01	98.50	99.00	99.17	99.25	99.30	99.33
3	.10	5.54	5.46	5.39	5.34	5.31	5.28
	.05	10.13	9.55	9.28	9.12	9.01	8.94
	.01	34.12	30.82	29.46	28.71	28.24	27.91
4	.10	4.54	4.32	4.19	4.11	4.05	4.01
	.05	7.71	6.94	6.59	6.39	6.26	6.16
	.01	21.20	18.00	16.69	15.98	15.52	15.21
5	.10	4.06	3.78	3.62	3.52	3.45	3.40
	.05	6.61	5.79	5.41	5.19	5.05	4.95
	.01	16.26	13.27	12.06	11.39	10.97	10.67
6	.10	3.78	3.46	3.29	3.18	3.11	3.05
	.05	5.99	5.14	4.76	4.53	4.39	4.28
	.01	13.75	10.92	9.78	9.15	8.75	8.47
7	.10	3.59	3.26	3.07	2.96	2.88	2.83
	.05	5.59	4.74	4.35	4.12	3.97	3.87
	.01	12.25	9.55	8.45	7.85	7.46	7.19

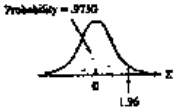
APPENDIX E t-Table Cutoff Values

For confidence intervals and two-tailed hypothesis tests, find the risk column of interest, α, at the top of the table; for one-tailed tests, find the risk column at the bottom. The cutoff value is then found at the intersection of the risk column and the df row.



Degrees of Freedom, df	Two-Tailed α (Probability in Both Tails Combined)					
	.20	.10	.05	.02	.01	.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
≥ 30	1.282	1.645	1.960	2.326	2.576	3.291
	.10	.05	.025	.01	.005	.0005
	One-Tailed α (Probability in One Tail Only)					

Ba. Z-table



Entries in the body of the table are cumulative probabilities from $-\infty$ to Z (see shaded area of figure).

Example: $P(-\infty < Z \le 1.96) = .9750$

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

參考用