

國立臺北大學 108 學年度碩士班一般入學考試試題

系(所)組別：企業管理學系甲組

科 目：統計學

第 1 頁 共 3 頁

☐可 ☒不可使用計算機

1. 線性迴歸模式： $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$ ， β_0 是截距項， β_1 、 β_2 是解釋變數(X_1 與 X_2)的係數， ε_i 是隨機誤差項， $i = 1, 2, \dots, n$ 。模式估計與檢定需要一些假設：(1)誤差項的變異數同質($\text{var}(\varepsilon_i) = \sigma^2$)；(2)誤差項之間不共變($\text{cov}(\varepsilon_i, \varepsilon_j) = 0, i \neq j$)；(3) X_1, X_2 沒有共線性(collinearity)。
(a) 請分別說明違反這些假設，該模式估計或檢定會產生甚麼問題？(15%)
(b) 請寫出這個模式 F-value 的式子及其所檢定的虛無(null)與對立(alternative)假設為何？(5%)
(c) 如果無法拒絕虛無假設，並不表示 Y 與 X_1, X_2 沒有關係？為什麼？(10%)
2. 變異數分析模式可分成固定效果模式(fixed-effect model)與隨機效果模式(random-effect model)，請以單因子模式為例，說明兩種模式(符號自訂)及用途上的差異？(20%)
3. In a city, 100 people were surveyed and 50 thought that climate change was not caused by human pollution.
(1) Find the margin of error for a 95% confidence interval. (10%)
(2) We expect that the margin of error is not greater than 0.02. How many people should be surveyed? (95% confidence interval) (10%)
4. The employee with low productivity in KID company is 5%. For the employee marked as low productivity, the attendance system showed that the probability of personal leave twice in a month is 100%. In contrast, the probability of personal leave twice in a month for other employees is 20%. Mary took the personal leave twice in the last month. What is the probability that Mary is an employee with low productivity? (10%)
5. One survey of education level in Taipei showed that 33 persons are elementary school, 44 persons are junior high school, 89 persons are senior high school, 14 persons are undergraduate and 20 persons are graduate. In Taiwan, the survey of education level showed that 10.2% of population is elementary school, 12.3% of population is junior high school, 57.9% of population is senior high school, 7% of population is undergraduate and 12.6% of population is graduate. Is the education level in Taipei significantly different from the education level in Taiwan? (95% confidence interval) (20%)

試題隨卷繳交

接背面

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Z Distribution

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010

試題隨卷繳交

接下頁

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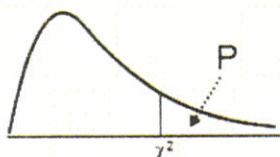
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Chi-square Distribution



	P									
DF	0.995	0.975	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.001
1	0.0000393	0.000982	1.642	2.706	3.841	5.024	5.412	6.635	7.879	10.828
2	0.0100	0.0506	3.219	4.605	5.991	7.378	7.824	9.210	10.597	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.860	18.467
5	0.412	0.831	7.289	9.236	11.070	12.833	13.388	15.086	16.750	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	22.458
7	0.989	1.690	9.803	12.017	14.067	16.013	16.622	18.475	20.278	24.322
8	1.344	2.180	11.030	13.362	15.507	17.535	18.168	20.090	21.955	26.124
9	1.735	2.700	12.242	14.684	16.919	19.023	19.679	21.666	23.589	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	29.588
11	2.603	3.816	14.631	17.275	19.675	21.920	22.618	24.725	26.757	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.300	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32.000	34.267	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	40.790
18	6.265	8.231	22.760	25.989	28.869	31.526	32.346	34.805	37.156	42.312
19	6.844	8.907	23.900	27.204	30.144	32.852	33.687	36.191	38.582	43.820
20	7.434	9.591	25.038	28.412	31.410	34.170	35.020	37.566	39.997	45.315
21	8.034	10.283	26.171	29.615	32.671	35.479	36.343	38.932	41.401	46.797
22	8.643	10.982	27.301	30.813	33.924	36.781	37.659	40.289	42.796	48.268
23	9.260	11.689	28.429	32.007	35.172	38.076	38.968	41.638	44.181	49.728
24	9.886	12.401	29.553	33.196	36.415	39.364	40.270	42.980	45.559	51.179
25	10.520	13.120	30.675	34.382	37.652	40.646	41.566	44.314	46.928	52.620
26	11.160	13.844	31.795	35.563	38.885	41.923	42.856	45.642	48.290	54.052
27	11.808	14.573	32.912	36.741	40.113	43.195	44.140	46.963	49.645	55.476
28	12.461	15.308	34.027	37.916	41.337	44.461	45.419	48.278	50.993	56.892
29	13.121	16.047	35.139	39.087	42.557	45.722	46.693	49.588	52.336	58.301
30	13.787	16.791	36.250	40.256	43.773	46.979	47.962	50.892	53.672	59.703

試題隨卷繳交