

一、設以資本額對公司分類，計分四類，並以 $X_i, i=1,2,3,4$ 分別為不同類公司之資本額代表值。下表中，表示各由第 i 類公司中，抽出 n_i 個公司，並記錄其年獲利情況 $y_{ij}, i=1,2,3,4, j=1,2,\dots,n_i$ 。

	X_1	X_2	X_3	X_4
Y	y_{11}	y_{21}	y_{31}	y_{41}
	y_{12}	y_{22}	y_{32}	y_{42}
	\vdots	\vdots	\vdots	\vdots
	y_{1n_1}	y_{2n_2}	y_{3n_3}	y_{4n_4}

(一)若想做 $\begin{cases} H_0: \text{各類公司之獲利情形無差異。} & V.S. \\ H_a: \text{各類公司之獲利情形不同。} \end{cases}$

之檢定，要怎麼做？這樣做分析，需要那些假設(對資料)？
所得的可能結論為何？ (5分)(5分)(5分)

(二)若想做 $\begin{cases} H_0: \text{各類公司之獲利情形無差異。} & V.S. \\ H_a: \text{各類公司之獲利與資本額大小成線性關係。} \end{cases}$

之檢定，則要怎麼做？這樣做分析，對資料需要那些假設？
分析所得的可能結論又為何？ (5分)(5分)(5分)

二、假設對公司「益本比」之認定，有新舊二種認定準則，今由李會計師對 6 家公司同時施用，而得認定資料如下表：

公司編號	認定結果	
	新準則	舊準則
1	0.30	0.20
2	0.40	0.32
3	0.35	0.21
4	0.20	0.16
5	0.10	0.01
6	0.22	0.12

(一)請用上述資料檢定下述命題($\alpha=0.05$):

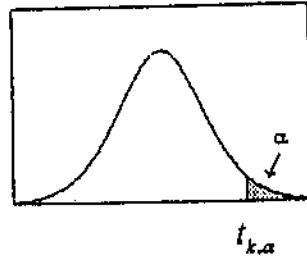
$\begin{cases} H_0: \text{二種準則認定之結果無差異。} & V.S. \\ H_a: \text{新準則較舊準則寬} 0.1. \end{cases}$ (8分)

(二)上述檢定結果若為棄卻 H_0 ，則請計算(或表示出)它的實際 p-值(p-value)。若為接受 H_0 ，則請計算其發生型 II 錯誤(type II error)之機率。 (6分)

(三)需對資料有那些假設，(一)之檢定，才是個好檢定？ (6分)

t分配表

$$P(t_k \geq t_{k,\alpha}) = \alpha$$



自由度	單尾顯著水準						
	0.1	0.05	0.025	0.01	0.005	0.0025	0.001
1	3.0777	6.3138	12.7062	31.8205	63.6567	127.3213	318.3088
2	1.8856	2.9200	4.3027	6.9646	9.9248	14.0890	22.3271
3	1.6377	2.3534	3.1824	4.5407	5.8409	7.4533	10.2145
4	1.5332	2.1318	2.7764	3.7469	4.6041	5.5976	7.1732
5	1.4759	2.0150	2.5706	3.3649	4.0321	4.7733	5.8934
6	1.4398	1.9432	2.4469	3.1427	3.7074	4.3168	5.2076
7	1.4149	1.8946	2.3646	2.9980	3.4995	4.0293	4.7853
8	1.3968	1.8595	2.3060	2.8965	3.3554	3.9325	4.5008
9	1.3830	1.8331	2.2622	2.8214	3.2498	3.6897	4.2968
10	1.3722	1.8125	2.2281	2.7638	3.1693	3.5814	4.1437
11	1.3634	1.7959	2.2010	2.7181	3.1058	3.4966	4.0247
12	1.3562	1.7823	2.1788	2.6810	3.0545	3.4284	3.9296
13	1.3502	1.7709	2.1604	2.6503	3.0123	3.3725	3.8520
14	1.3450	1.7613	2.1448	2.6245	2.9768	3.3257	3.7874
15	1.3406	1.7531	2.1314	2.6025	2.9467	3.2860	3.7328
16	1.3368	1.7459	2.1199	2.5835	2.9208	3.2520	3.6862
17	1.3334	1.7396	2.1098	2.5669	2.8982	3.2224	3.6458
18	1.3304	1.7341	2.1009	2.5524	2.8784	3.1966	3.6105
19	1.3277	1.7291	2.0930	2.5395	2.8609	3.1737	3.5794
20	1.3253	1.7247	2.0860	2.5280	2.8453	3.1534	3.5518
21	1.3232	1.7207	2.0796	2.5176	2.8314	3.1352	3.5272
22	1.3212	1.7171	2.0739	2.5083	2.8188	3.1188	3.5050
23	1.3195	1.7139	2.0687	2.4999	2.8073	3.1040	3.4850
24	1.3178	1.7109	2.0639	2.4922	2.7969	3.0905	3.4668
25	1.3163	1.7081	2.0595	2.4851	2.7874	3.0782	3.4502
26	1.3150	1.7056	2.0555	2.4786	2.7787	3.0669	3.4350
27	1.3137	1.7033	2.0518	2.4727	2.7707	3.0565	3.4210
28	1.3125	1.7011	2.0484	2.4671	2.7633	3.0469	3.4082
29	1.3114	1.6991	2.0452	2.4620	2.7564	3.0380	3.3962
30	1.3104	1.6973	2.0423	2.4573	2.7500	3.0298	3.3852
35	1.3062	1.6896	2.0301	2.4377	2.7238	2.9960	3.3400
40	1.3031	1.6839	2.0211	2.4233	2.7045	2.9712	3.3069
45	1.3006	1.6794	2.0141	2.4121	2.6896	2.9521	3.2815
50	1.2987	1.6759	2.0086	2.4033	2.6778	2.9370	3.2614
60	1.2958	1.6706	2.0003	2.3901	2.6603	2.9146	3.2317
70	1.2938	1.6669	1.9944	2.3808	2.6479	2.8987	3.2108
80	1.2922	1.6641	1.9901	2.3739	2.6387	2.8870	3.1953
90	1.2910	1.6620	1.9867	2.3685	2.6316	2.8779	3.1833
100	1.2901	1.6602	1.9840	2.3642	2.6259	2.8707	3.1737
200	1.2858	1.6525	1.9719	2.3451	2.6006	2.8385	3.1315
300	1.2844	1.6499	1.9679	2.3388	2.5923	2.8279	3.1176
400	1.2837	1.6487	1.9659	2.3357	2.5882	2.8227	3.1107
500	1.2832	1.6479	1.9647	2.3338	2.5857	2.8195	3.1066
600	1.2830	1.6474	1.9639	2.3326	2.5840	2.8175	3.1039
700	1.2828	1.6470	1.9634	2.3317	2.5829	2.8160	3.1019
800	1.2826	1.6468	1.9629	2.3310	2.5820	2.8148	3.1005
900	1.2825	1.6465	1.9626	2.3305	2.5813	2.8140	3.0993
1000	1.2824	1.6464	1.9623	2.3301	2.5808	2.8133	3.0984

三、Suppose there are three decision makers A, B, and C with the following utility functions:

$$A: U(W) = W$$

$$B: U(w) = \sqrt{W}$$

$$C: U(W) = -\exp(-rW)$$

Discuss the characteristics of these decision makers (W denotes the wealth of the decision maker) (15分)

四、Billy wants to purchase a book from his friend, Scott. This book has private value to Scott denoted V . Scott knows V ; Billy only knows V is uniformly distributed between 0 and 100. Scott knows this about Billy. Finally, whatever V is, the value of the book to Billy is $1.5V$. Scott also knows this about Billy.

(1) Who should own this book and why?

(2) Suppose the trade encounter between the two individuals proceeds as follows. Billy offers to purchase the book at price P . If Scott agrees, Billy pays P in exchange for the book. If Scott does not agree, the game ends, and Scott keeps the book. What is the equilibrium of this game? Explain.

(3) Use this example to explain the phenomenon of "winner's curse". (15分)

五、Consider the industry in which N firms all produce an undifferentiated product. Demand for the product is given by $X = A - P$. Each producer is identical, having a constant average cost of k .

(1) Suppose all N producers have Cournot conjectures. What is the symmetric equilibrium in this case? What happens to the equilibrium price as N approaches infinity?

(2) Suppose all N firms have Bertrand conjectures. What is the symmetric equilibrium in this case?

(3) Suppose one firm is a Stackelberg leader and all the rest have Cournot conjectures. What equilibria can you find? What happens to price as N goes to infinity? (20分)