



11.多變異量分析

Input data

	X1	X2	X3	X4
	-3.4848813025	1.8863108554	1.0455165165	3.8725706894
	-1.0351366628	4.2176641241	3.1808356630	4.8466488648
	-2.4625313972	3.7988856782	2.3955634730	3.8005416222
	-0.9870787229	3.3844867159	1.4232433406	2.6215157643
	-1.6107958450	3.1247134558	1.1564855235	5.2941326785
	-0.9248306657	4.7785821871	3.2024557214	4.4618152371
	-2.4142573454	2.2082301782	2.0414654297	3.4307654206
	-1.7401622114	4.8150435661	3.8007819439	5.1592084299
	-1.2562990285	4.4328994987	3.8452387951	4.9682837879
	-1.9276655607	3.0131085480	2.6389897466	4.4696304686
	-0.9095226703	2.3661759074	2.0368035701	4.5722524846
	-4.6039445252	1.5296688003	0.9445432373	3.1276292059
	-0.9559950792	4.7685464023	2.4306097890	4.5954971684
	-1.5578741563	2.4438579811	3.1888714118	4.5727564900
	-3.3699919229	1.3088035673	1.3016587253	2.3908690364
	-3.8887148985	1.7814225617	0.7643101215	3.0000569264
	-2.0677976245	3.1018460522	2.9734297299	3.7714991045
	-2.4794560673	1.3213704925	0.5126106562	2.6616093575
	-1.2254340714	3.6612492939	1.5289340867	4.5491520516
	0.7330672037	5.0547591853	1.8463859999	4.2222899899
	-2.8092578112	2.3237087918	3.1552381810	4.2784646955
	-0.5552700004	4.3546586953	2.3791419952	5.0950083414
	-1.7881057759	2.1529761956	1.0996090891	3.2823972251
	-3.2965380079	2.1741082010	2.7751562092	3.1949419991
	-2.4423683606	2.5323914049	2.0305222099	2.8618088064
	-2.5166834285	2.5811769903	0.5432994334	2.7105371983
	-3.9743639446	1.2274884527	1.0657531620	2.5132779569
	-2.6647445982	3.1254832295	1.6198959271	2.5126065134
	-2.0831487540	3.5959880072	2.9671363726	4.1702554910
	-1.8756088350	2.1931531672	1.6146571560	2.4130606408
X1 is	Normal(mu=-2.000000,sigma*sigma=1.000000),			
X2 is	Normal(mu=H1,sigma*sigma=0.360000), H1(X1)= 4.600000+0.800000*X1.			
X3 is	Normal(mu=H1,sigma*sigma=0.480000), H1(X1,X2)= 0.133333+0.066667*X1+0.666667*X2.			
X4 is	Normal(mu=H1,sigma*sigma=0.400625), H1(X1,X2,X3)= 3.441667+0.345833*X1+0.208333*X2+0.312500*X3.			
X1 is	mean= -2.0725130690, s.d.= 1.1539936016, variance=1.3317012325, skewed coefficient=-0.0636615914, kurtosis coefficient=2.8314510312, MAD=0.8983799599, Q1=-2.6647445982, median=-1.9977315926, Q3=-1.1302853671, MIN=-4.6039445252, MAX=0.7330672037, Range=5.3370117290, Mid-Range=-1.9354386607, C.V. is not exist, sample size=30			
X2 is	mean=2.9752919396, s.d.= 1.1556059685, variance=1.3354251545, skewed coefficient=0.2674007804, kurtosis coefficient=1.8098535867, MAD=0.9732357031, Q1=2.1741082010, median=2.7971427691, Q3=4.0082749011, MIN=1.2274884527, MAX=5.0547591853, Range=3.8272707325, Mid-Range=3.1411238190, C.V.= 0.3884008669, sample size=30			
X3 is	mean=2.0503047739, s.d.= 0.9681462238, variance=0.9373071107, skewed coefficient=0.1528736154, kurtosis coefficient=1.7915563849, MAD=0.8186324647, Q1=1.1564855235, median=2.0336628900, Q3=.9702830513, MIN=0.5126106562, MAX=3.8452387951, Range=3.3326281389, Mid-Range=2.1789247256, C.V.= 0.4721962491, sample size=30			
X4 is	mean=3.7807027882, s.d.= 0.9444397548, variance=0.8919664504, skewed coefficient=-0.0497817259, kurtosis coefficient=1.5000021685, MAD=0.8291509253, Q1=2.8618088064, median=3.8365561558, Q3=4.5725044873, MIN=2.3908690364, MAX=5.2941326785, Range=2.9032636421, Mid-Range=3.8425008575, C.V.= 0.2498053425, sample size=30			



random variables sample correlation coefficient-----

r(X1,X2)=	0.7754544346
r(X1,X3)=	0.3942766069
r(X1,X4)=	0.5758543046
r(X2,X3)=	0.6097896116
r(X2,X4)=	0.6748777978
r(X3,X4)=	0.6346989258

Output data

r(X1,X2)=0.775454,
r(X1,X3)=0.394277,
r(X1,X4)=0.575854,
r(X2,X3)=0.609790,
r(X2,X4)=0.674878,
r(X3,X4)=0.634699,

Dependent variable is X1,
Independent variables are X2
The correlation matrix is below
r(X1,X2)=0.775454,
The estimated line is $X1 = -4.376497 + 0.774372 * X2$ ANOVA

Source	df	SS	MS	F
Regression	1	22.4221576068	22.4221576068	38.7610982439
error	28	16.1971781357	0.5784706477	
total	29	38.6193357425		

The F test p value=0.000100

Individual test

variable	coefficient	standard error	t test	p value
intercept	-4.3764972571	0.5117764346	-8.55158	0.00000
X2	0.7743724767	0.1606908784	4.81902	0.00000

MSE= 0.5784706477 , R2=0.580594 , R2(adj)=0.565615
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
C.V.=-----

Dependent variable is X1,
Independent variables are X3
The correlation matrix is below
r(X1,X3)=0.394277,
The estimated line is $X1 = -3.036080 + 0.469963 * X3$ ANOVA

Source	df	SS	MS	F
Regression	1	5.7965135293	5.7965135293	4.9448026671
error	28	32.8228222132	1.1722436505	
total	29	38.6193357425		

The F test p value=0.034400

Individual test

variable	coefficient	standard error	t test	p value
intercept	-3.0360799810	0.4335733274	-7.00246	0.00020
X3	0.4699627705	0.1918050534	2.45021	0.02060

MSE= 1.1722436505 , R2=0.150094 , R2(adj)=0.119740
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
C.V.=-----



Dependent variable is X1,
Independent variables are X4
The correlation matrix is below
 $r(X1,X4)=0.575854$,
The estimated line is $X1=-4.732713+0.703626*X4$ ANOVA

Source	df	SS	MS	F
Regression	1	12.3648846210	12.3648846210	13.1869741929
error	28	26.2544511215	0.9376589686	
total	29	38.6193357425		

The F test p value=0.001200

Individual test

variable	coefficient	standard error	t test	p value
intercept	-4.7327131127	0.7654525811	-6.18290	0.00020
X4	0.7036258052	0.1966195697	3.57862	0.00120

MSE= 0.9376589686 , R2=0.320173 , R2(adj)=0.295894
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
C.V.=-----

Dependent variable is X1,
Independent variables are X2,X3
The correlation matrix is below
 $r(X1,X2)=0.775454$,
 $r(X1,X3)=0.394277$,
 $r(X2,X3)=0.609790$,
The estimated line is $X1=-4.297415+0.850556*X2-0.149124*X3$ ANOVA

Source	df	SS	MS	F
Regression	2	23.6026512813	11.8013256406	21.2187845540
error	27	15.0166844612	0.5561734986	
total	29	38.6193357425		

The F test p value=0.000100

Individual test

variable	coefficient	standard error	t test	p value
intercept	-4.2974145971	0.5276230593	-8.14486	0.00000
X2	0.850556229	0.2027483138	4.19513	0.00020
X3	-0.1491240545	0.2420059654	-0.61620	0.54300

MSE= 0.5561734986 , R2=0.611162 , R2(adj)=0.582359
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
C.V.=-----

Dependent variable is X1,
Independent variables are X2,X4
The correlation matrix is below
 $r(X1,X2)=0.775454$,
 $r(X1,X4)=0.575854$,
 $r(X2,X4)=0.674878$,
The estimated line is $X1=-4.628640+0.709376*X2+0.117843*X4$ ANOVA

Source	df	SS	MS	F
Regression	2	23.4185540683	11.7092770341	20.7983041068
error	27	15.2007816742	0.5629919139	
total	29	38.6193357425		

The F test p value=0.000100



Individual test				
variable	coefficient	standard error	t test	p value
intercept	-4.6286404642	0.7661189825	-6.04167	0.00020
X2	0.7093757334	0.2177591176	3.25762	0.00300
X4	0.1178425066	0.2664476318	0.44227	0.66180
MSE= 0.5629919139 , R2=0.606395 , R2(adj)=0.577239				
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.=-----				
Dependent variable is X1, Independent variables are X3,X4 The correlation matrix is below r(X1,X3)=0.394277, r(X1,X4)=0.575854, r(X3,X4)=0.634699, The estimated line is $X1 = -4.709185 + 0.057452 * X3 + 0.666246 * X4$ ANOVA				
Source	df	SS	MS	F
Regression	2	12.8600639843	6.4300319921	6.7397426999
error	27	25.7592717582	0.9540471022	
total	29	38.6193357425		
The F test p value=0.004300				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	-4.7091846096	0.7721725162	-6.09862	0.00020
X3	0.0574516105	0.2482079467	0.23147	0.81860
X4	0.6662460316	0.2544382372	2.61850	0.01420
MSE= 0.9540471022 , R2=0.332995 , R2(adj)=0.283588				
dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.=-----				
Dependent variable is X1, Independent variables are X2,X3,X4 The correlation matrix is below r(X1,X2)=0.775454, r(X1,X3)=0.394277, r(X1,X4)=0.575854, r(X2,X3)=0.609790, r(X2,X4)=0.674878, r(X3,X4)=0.634699, The estimated line is $X1 = -4.710590 + 0.771442 * X2 - 0.222337 * X3 + 0.211249 * X4$ ANOVA				
Source	df	SS	MS	F
Regression	3	24.1397151570	8.0465717190	14.4486427292
error	26	14.4796205855	0.5569084841	
total	29	38.6193357425		
The F test p value=0.000100				



Individual test				
variable	coefficient	standard error	t test	p value
intercept	-4.7105895334	0.7721726295	-6.10044	0.00020
X2	0.7714424171	0.2296971888	3.35852	0.00240
X3	-0.2223367006	0.2618152949	-0.84921	0.40360
X4	0.2112485700	0.2882576269	0.73285	0.47020

MSE= 0.5569084841 , R2=0.625068 , R2(adj)=0.581807
 dependent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
 independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
 independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
 independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
 C.V.=-----

Dependent variable is X2,
 Independent variables are X1
 The correlation matrix is below
 $r(X2,X1)=0.775454$,
 The estimated line is $X2=4.584677+0.776538*X1$ ANOVA

Source	df	SS	MS	F
Regression	1	22.4848581311	22.4848581311	38.7610982439
error	28	16.2424713487	0.5800882625	
total	29	38.7273294798		

The F test p value=0.000100

Individual test				
variable	coefficient	standard error	t test	p value
intercept	4.5846768949	0.3802040130	12.05847	0.00000
X1	0.7765379043	0.1609153967	4.82575	0.00000

MSE= 0.5800882625 , R2=0.580594 , R2(adj)=0.565615
 dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
 independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
 C.V.= 0.2559867304

Dependent variable is X2,
 Independent variables are X3
 The correlation matrix is below
 $r(X2,X3)=0.609790$,
 The estimated line is $X2=1.482954+0.727862*X3$ ANOVA

Source	df	SS	MS	F
Regression	1	13.9039317304	13.9039317304	15.6831910111
error	28	24.8233977495	0.8865499196	
total	29	38.7273294798		

The F test p value=0.000500

Individual test				
variable	coefficient	standard error	t test	p value
intercept	1.4829537095	0.4335733274	3.42031	0.00180
X3	0.7278616570	0.1918050534	3.79480	0.00060

MSE= 0.8865499196 , R2=0.359021 , R2(adj)=0.336129
 dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
 independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
 C.V.= 0.3164623230



Dependent variable is X2,
Independent variables are X4
The correlation matrix is below
 $r(X2,X4)=0.674878$,
The estimated line is $X2=-0.146710+0.825773*X4$ ANOVA

Source	df	SS	MS	F
Regression	1	17.0305183115	17.0305183115	21.9780920350
error	28	21.6968111683	0.7748861132	
total	29	38.7273294798		

The F test p value=0.000100

Individual test

variable	coefficient	standard error	t test	p value
intercept	-0.1467101898	0.7654525811	-0.19166	0.84940
X4	0.8257729592	0.1966195697	4.19985	0.00020

MSE= 0.7748861132 , R2=0.439755 , R2(adj)=0.419746
dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
C.V.= 0.2958621121

Dependent variable is X2,
Independent variables are X1,X3
The correlation matrix is below
 $r(X2,X1)=0.775454$,
 $r(X2,X3)=0.609790$,
 $r(X1,X3)=0.394277$,
The estimated line is $X2=3.409029+0.634396*X1+0.429719*X3$ ANOVA

Source	df	SS	MS	F
Regression	2	27.5269827755	13.7634913877	33.1788182347
error	27	11.2003467044	0.4148276557	
total	29	38.7273294798		

The F test p value=0.000100

Individual test

variable	coefficient	standard error	t test	p value
intercept	3.4090293530	0.6860050008	4.96939	0.00000
X1	0.6343955546	0.1750999236	3.62305	0.00100
X3	0.4297193645	0.2087124718	2.05891	0.04920

MSE= 0.4148276557 , R2=0.710790 , R2(adj)=0.689367
dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
C.V.= 0.2164732639

Dependent variable is X2,
Independent variables are X1,X4
The correlation matrix is below
 $r(X2,X1)=0.775454$,
 $r(X2,X4)=0.674878$,
 $r(X1,X4)=0.575854$,
The estimated line is $X2=2.596113+0.579546*X1+0.417990*X4$ ANOVA

Source	df	SS	MS	F
Regression	2	26.3085962036	13.1542981018	28.5992170739
error	27	12.4187332762	0.4599530843	
total	29	38.7273294798		

The F test p value=0.000100



Individual test				
variable	coefficient	standard error	t test	p value
intercept	2.5961134592	1.2056729634	2.15325	0.04020
X1	0.5795457243	0.1968258054	2.94446	0.00640
X4	0.4179896323	0.2404978389	1.73802	0.09360
MSE= 0.4599530843 , R2=0.679329 , R2(adj)=0.655576				
dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.2279434840				
Dependent variable is X2, Independent variables are X3,X4 The correlation matrix is below r(X2,X3)=0.609790, r(X2,X4)=0.674878, r(X3,X4)=0.634699, The estimated line is $X2=0.001821+0.362682*X3+0.589801*X4$ ANOVA				
Source	df	SS	MS	F
Regression	2	19.7738634983	9.8869317491	14.0843451792
error	27	18.9534659816	0.7019802215	
total	29	38.7273294798		
The F test p value=0.000100				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	0.0018211648	0.7721725162	0.00236	0.99800
X3	0.3626820420	0.2482079467	1.46120	0.15540
X4	0.5898009385	0.2544382372	2.31805	0.02820
MSE= 0.7019802215 , R2=0.510592 , R2(adj)=0.474340				
dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.2816001309				
Dependent variable is X2, Independent variables are X1,X3,X4 The correlation matrix is below r(X2,X1)=0.775454, r(X2,X3)=0.609790, r(X2,X4)=0.674878, r(X1,X3)=0.394277, r(X1,X4)=0.575854, r(X3,X4)=0.634699, The estimated line is $X2=2.674854+0.567621*X1+0.330071*X3+0.211626*X4$ ANOVA				
Source	df	SS	MS	F
Regression	3	28.0733405485	9.3577801828	22.8367315115
error	26	10.6539889314	0.4097688051	
total	29	38.7273294798		
The F test p value=0.000100				



Individual test				
variable	coefficient	standard error	t test	p value
intercept	2.6748539762	1.2071290695	2.21588	0.03560
X1	0.5676211559	0.1970303866	2.88088	0.00780
X3	0.3300712925	0.2484659347	1.32844	0.19540
X4	0.2116255959	0.2863054604	0.73916	0.46640
MSE= 0.4097688051 , R2=0.724897 , R2(adj)=0.693155				
dependent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.2151492621				
Dependent variable is X3, Independent variables are X1 The correlation matrix is below $r(X3,X1)=0.394277$, The estimated line is $X3=2.735850+0.330779*X1$ ANOVA				
Source	df	SS	MS	F
Regression	1	4.0798290304	4.0798290304	4.9448026671
error	28	23.1020771796	0.8250741850	
total	29	27.1819062100		
The F test p value=0.034400				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	2.7358495775	0.3802040130	7.19574	0.00000
X1	0.3307794840	0.1609153967	2.05561	0.04920
MSE= 0.8250741850 , R2=0.150094 , R2(adj)=0.119740				
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
C.V.= 0.4430248392				
Dependent variable is X3, Independent variables are X2 The correlation matrix is below $r(X3,X2)=0.609790$, The estimated line is $X3=0.530315+0.510871*X2$ ANOVA				
Source	df	SS	MS	F
Regression	1	9.7588801841	9.7588801841	15.6831910111
error	28	17.4230260259	0.6222509295	
total	29	27.1819062100		
The F test p value=0.000500				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	0.5303145778	0.5117764346	1.03622	0.30880
X2	0.5108709421	0.1606908784	3.17922	0.00340
MSE= 0.6222509295 , R2=0.359021 , R2(adj)=0.336129				
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
C.V.= 0.3847373542				



Dependent variable is X3,
Independent variables are X4
The correlation matrix is below
 $r(X3,X4)=0.634699$,
The estimated line is $X3=-0.409536+0.650631*X4$ ANOVA

Source	df	SS	MS	F
Regression	1	10.5724458533	10.5724458533	17.8228839187
error	28	16.6094603568	0.5931950127	
total	29	27.1819062100		

The F test p value=0.000300

Individual test

variable	coefficient	standard error	t test	p value
intercept	-0.4095360051	0.7654525811	-0.53502	0.59700
X4	0.6506305618	0.1966195697	3.30908	0.00240

MSE= 0.5931950127 , R2=0.388952 , R2(adj)=0.367128
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
C.V.= 0.3756473441

Dependent variable is X3,
Independent variables are X1,X2
The correlation matrix is below
 $r(X3,X1)=0.394277$,
 $r(X3,X2)=0.609790$,
 $r(X1,X2)=0.775454$,
The estimated line is $X3=-0.193460+-0.165378*X1+0.638935*X2$ ANOVA

Source	df	SS	MS	F
Regression	2	10.5284990790	5.2642495395	8.5348743622
error	27	16.6534071311	0.6167928567	
total	29	27.1819062100		

The F test p value=0.001400

Individual test

variable	coefficient	standard error	t test	p value
intercept	-0.1934601390	1.2271738213	-0.15765	0.87600
X1	-0.1653776238	0.2548534948	-0.64891	0.52200
X2	0.6389348222	0.2544979088	2.51057	0.01820

MSE= 0.6167928567 , R2=0.387335 , R2(adj)=0.341952
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
C.V.= 0.3830462763

Dependent variable is X3,
Independent variables are X1,X4
The correlation matrix is below
 $r(X3,X1)=0.394277$,
 $r(X3,X4)=0.634699$,
 $r(X1,X4)=0.575854$,
The estimated line is $X3=-0.238556+0.036127*X1+0.625210*X4$ ANOVA

Source	df	SS	MS	F
Regression	2	10.9837235737	5.4918617868	9.1541299153
error	27	16.1981826364	0.5999326902	
total	29	27.1819062100		

The F test p value=0.001000



Individual test				
variable	coefficient	standard error	t test	p value
intercept	-0.2385560900	1.2056729634	-0.19786	0.84480
X1	0.0361272511	0.1968258054	0.18355	0.85560
X4	0.6252104956	0.2404978389	2.59965	0.01480
MSE= 0.5999326902 , R2=0.404082 , R2(adj)=0.359940				
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.3777746751				
Dependent variable is X3, Independent variables are X2,X4 The correlation matrix is below r(X3,X2)=0.609790, r(X3,X4)=0.634699, r(X2,X4)=0.674878, The estimated line is X3=-0.368581+0.279156*X2+0.420111*X4 ANOVA				
Source	df	SS	MS	F
Regression	2	12.5934286277	6.2967143139	11.6538059243
error	27	14.5884775823	0.5403139845	
total	29	27.1819062100		
The F test p value=0.000300				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	-0.3685809360	0.7661189825	-0.48110	0.63440
X2	0.2791562685	0.2177591176	1.28195	0.21060
X4	0.4201108638	0.2664476318	1.57671	0.12640
MSE= 0.5403139845 , R2=0.463302 , R2(adj)=0.423546				
dependent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.3585128126				
Dependent variable is X3, Independent variables are X1,X2,X4 The correlation matrix is below r(X3,X1)=0.394277, r(X3,X2)=0.609790, r(X3,X4)=0.634699, r(X1,X2)=0.775454, r(X1,X4)=0.575854, r(X2,X4)=0.674878, The estimated line is X3=-1.356244+-0.213381*X1+0.430523*X2+0.445256*X4 ANOVA				
Source	df	SS	MS	F
Regression	3	13.2855405600	4.4285135200	8.2857168860
error	26	13.8963656500	0.5344756019	
total	29	27.1819062100		
The F test p value=0.000500				



Individual test				
variable	coefficient	standard error	t test	p value
intercept	-1.3562436424	1.4129260636	-0.95988	0.34600
X1	-0.2133807355	0.2564879930	-0.83193	0.41320
X2	0.4305233842	0.2837666481	1.51717	0.14120
X4	0.4452561846	0.2681564887	1.66043	0.10880
MSE= 0.5344756019 , R2=0.488764 , R2(adj)=0.429775				
dependent variable:X3, sample mean= 3.7807027882 , sample variance=0.891966				
independent variable:X1, sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X2, sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X4, sample mean= 0.0000000000 , sample variance=0.000000				
C.V.= 0.3565705900				
Dependent variable is X4, Independent variables are X1 The correlation matrix is below $r(X4,X1)=0.575854$, The estimated line is $X4=4.757447+0.471285*X1$ ANOVA				
Source	df	SS	MS	F
Regression	1	8.2819343980	8.2819343980	13.1869741929
error	28	17.5850926643	0.6280390237	
total	29	25.8670270624		
The F test p value=0.001200				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	4.7574467933	0.3802040130	12.51288	0.00000
X1	0.4712848472	0.1609153967	2.92877	0.00660
MSE= 0.6280390237 , R2=0.320173 , R2(adj)=0.295894				
dependent variable:X4, sample mean= 0.0000000000 , sample variance=0.000000				
independent variable:X1, sample mean= 2.9752919396 , sample variance=1.335425				
C.V.= 0.2096142374				
Dependent variable is X4, Independent variables are X2 The correlation matrix is below $r(X4,X2)=0.674878$, The estimated line is $X4=2.139663+0.551556*X2$ ANOVA				
Source	df	SS	MS	F
Regression	1	11.3751421533	11.3751421533	21.9780920350
error	28	14.4918849091	0.5175673182	
total	29	25.8670270624		
The F test p value=0.000100				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	2.1396626253	0.5117764346	4.18085	0.00020
X2	0.5515560141	0.1606908784	3.43240	0.00180
MSE= 0.5175673182 , R2=0.439755 , R2(adj)=0.419746				
dependent variable:X4, sample mean= 0.0000000000 , sample variance=0.000000				
independent variable:X2, sample mean= 2.0503047739 , sample variance=0.937307				
C.V.= 0.1902877736				



Dependent variable is X4,
Independent variables are X3
The correlation matrix is below
 $r(X4,X3)=0.634699$,
The estimated line is $X4=2.511241+0.619157*X3$ ANOVA

Source	df	SS	MS	F
Regression	1	10.0610215078	10.0610215078	17.8228839187
error	28	15.8060055546	0.5645001984	
total	29	25.8670270624		

The F test p value=0.000300

Individual test

variable	coefficient	standard error	t test	p value
intercept	2.5112414172	0.4335733274	5.79196	0.00000
X3	0.6191573990	0.1918050534	3.22806	0.00300

MSE= 0.5645001984 , R2=0.388952 , R2(adj)=0.367128
dependent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966
C.V.= 0.1987282059

Dependent variable is X4,
Independent variables are X1,X2
The correlation matrix is below
 $r(X4,X1)=0.575854$,
 $r(X4,X2)=0.674878$,
 $r(X1,X2)=0.775454$,
The estimated line is $X4=2.611493+0.107810*X1+0.468071*X2$ ANOVA

Source	df	SS	MS	F
Regression	2	11.9603496901	5.9801748451	11.6105893949
error	27	13.9066773723	0.5150621249	
total	29	25.8670270624		

The F test p value=0.000300

Individual test

variable	coefficient	standard error	t test	p value
intercept	2.6114932116	1.2271738213	2.12805	0.04260
X1	0.1078100953	0.2548534948	0.42303	0.67560
X2	0.4680708436	0.2544979088	1.83919	0.07680

MSE= 0.5150621249 , R2=0.462378 , R2(adj)=0.422554
dependent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307
C.V.= 0.1898266878

Dependent variable is X4,
Independent variables are X1,X3
The correlation matrix is below
 $r(X4,X1)=0.575854$,
 $r(X4,X3)=0.634699$,
 $r(X1,X3)=0.394277$,
The estimated line is $X4=3.469218+0.315531*X1+0.470870*X3$ ANOVA

Source	df	SS	MS	F
Regression	2	13.6675633935	6.8337816967	15.1246080008
error	27	12.1994636689	0.4518319877	
total	29	25.8670270624		

The F test p value=0.000100



Individual test				
variable	coefficient	standard error	t test	p value
intercept	3.4692182370	0.6860050008	5.05713	0.00000
X1	0.3155308245	0.1750999236	1.80200	0.08260
X3	0.4708696585	0.2087124718	2.25607	0.03220
MSE= 0.4518319877 , R2=0.528378 , R2(adj)=0.493443				
dependent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
independent variable:X1 , sample mean= 2.9752919396 , sample variance=1.335425				
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
C.V.= 0.1777935286				
Dependent variable is X4, Independent variables are X2,X3 The correlation matrix is below r(X4,X2)=0.674878, r(X4,X3)=0.634699, r(X2,X3)=0.609790, The estimated line is $X4=1.955871+0.374503*X2+0.346571*X3$ ANOVA				
Source	df	SS	MS	F
Regression	2	13.8322406769	6.9161203385	15.5162911212
error	27	12.0347863855	0.4457328291	
total	29	25.8670270624		
The F test p value=0.000100				
Individual test				
variable	coefficient	standard error	t test	p value
intercept	1.9558709267	0.5276230593	3.70695	0.00080
X2	0.3745029174	0.2027483138	1.84713	0.07560
X3	0.3465710850	0.2420059654	1.43208	0.16360
MSE= 0.4457328291 , R2=0.534744 , R2(adj)=0.500281				
dependent variable:X4 , sample mean= 0.0000000000 , sample variance=0.000000				
independent variable:X2 , sample mean= 2.0503047739 , sample variance=0.937307				
independent variable:X3 , sample mean= 3.7807027882 , sample variance=0.891966				
C.V.= 0.1765894579				
Dependent variable is X4, Independent variables are X1,X2,X3 The correlation matrix is below r(X4,X1)=0.575854, r(X4,X2)=0.674878, r(X4,X3)=0.634699, r(X1,X2)=0.775454, r(X1,X3)=0.394277, r(X2,X3)=0.609790, The estimated line is $X4=2.683425+0.169300*X1+0.230503*X2+0.371818*X3$ ANOVA				
Source	df	SS	MS	F
Regression	3	14.2626585256	4.7542195085	10.6519977222
error	26	11.6043685368	0.4463218668	
total	29	25.8670270624		
The F test p value=0.000100				



Individual test				
variable	coefficient	standard error	t test	p value
intercept	2.6834251454	1.2280891601	2.18504	0.03800
X1	0.1693004485	0.2580554124	0.65606	0.51740
X2	0.2305034690	0.2988025275	0.77142	0.44740
X3	0.3718178543	0.2450464697	1.51734	0.14120

MSE=	0.4463218668	R2=0.551384	R2(adj)=0.499620	
dependent variable:X4, sample mean=	0.0000000000	sample variance=0.000000		
independent variable:X1, sample mean=	2.9752919396	sample variance=1.335425		
independent variable:X2, sample mean=	2.0503047739	sample variance=0.937307		
independent variable:X3, sample mean=	3.7807027882	sample variance=0.891966		
C.V.=	0.1767061012			