Sep 03, 07 4:44 **x2_2.sas** Page 1/1

```
/* x2_2.sas */
/* Purpose:  */

title1 'Example 2.2';

data a;
input x y;
cards;
2 2
5 12
15 4
16 21
16 41
19 14
26 31
24 29
16 31
36 8
39 30
42 44
44 26
40 60
42 34
42 34
50 14
51 41
58 58
64 47
;

proc print data=a;
  var x y;
title2 'List of data.';

proc princomp data=a cov;
  var x y;
title2 'Compute eigenvalues and eigenvectors.';

proc plot data=a;
  plot y*x;
title2 'Plot of data.';

proc corr data=a;
  var x y;
title2 'Correlations.';

proc reg data=a;
  model y=x;
title2 'Regression: y=a*x+b';

proc reg data=a;
  model x=y;
title2 'Regression: x=c*y+d';

run;
```

Example 2.2 1
List of data.

Obs	x	y
1	2	2
2	5	12
3	15	4
4	16	21
5	16	41
6	19	14
7	26	31
8	24	29
9	16	31
10	36	8
11	39	30
12	42	44
13	44	26
14	40	60
15	42	34
16	42	34
17	50	14
18	51	41
19	58	58
20	64	47

Example 2.2 2
Compute eigenvalues and eigenvectors.

The PRINCOMP Procedure

Observations	20
Variables	2

Simple Statistics

	x	y
Mean	32.35000000	29.05000000
StD	17.63750490	16.70951510

Covariance Matrix

	x	y
x	311.0815789	181.7710526
y	181.7710526	279.2078947

Total Variance 590.28947368

Eigenvalues of the Covariance Matrix

	Eigenvalue	Difference	Proportion	Cumulative
1	477.613086	364.936699	0.8091	0.8091
2	112.676388		0.1909	1.0000

Eigenvectors

	Prin1	Prin2
x	0.737340	-.675522
y	0.675522	0.737340

```
                                  Example 2.2                                  3
                                 Plot of data.

                Plot of y*x.  Legend: A = 1 obs, B = 2 obs, etc.

 y |
   |
60 +                                          A
58 +                                                            A
56 +
54 +
52 +
50 +
48 +                                                                  A
46 +
44 +                                            A
42 +                  A                                  A
40 +
38 +
36 +
34 +                                            B
32 +                  A         A
30 +                          A              A
28 +
26 +                                              A
24 +
22 +                  A
20 +
18 +
16 +
14 +                     A                              A
12 +       A
10 +
 8 +                                      A
 6 +
 4 +                 A
 2 +    A
   |
   ---+---------+---------+---------+---------+---------+---------+---------+--
      0        10        20        30        40        50        60        70

                                         x
```



```
                                  Example 2.2                                  4
                                 Correlations.

                               The CORR Procedure

                         2  Variables:    x        y


                               Simple Statistics

Variable         N         Mean      Std Dev          Sum      Minimum      Maximum

x               20     32.35000     17.63750    647.00000      2.00000     64.00000
y               20     29.05000     16.70952    581.00000      2.00000     60.00000


                  Pearson Correlation Coefficients, N = 20
                         Prob > |r| under H0: Rho=0

                                    x             y

                       x      1.00000       0.61677
                                             0.0038

                       y      0.61677       1.00000
                               0.0038

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                                  Example 2.2                                  5
                              Regression: y=a*x+b

                               The REG Procedure
                                 Model: MODEL1
                             Dependent Variable: y

                   Number of Observations Read          20
                   Number of Observations Used          20


                              Analysis of Variance

                                             Sum of           Mean
Source                        DF          Squares         Square    F Value    Pr > F

Model                          1       2018.03526     2018.03526      11.05    0.0038
Error                         18       3286.91474      182.60637
Corrected Total               19       5304.95000


             Root MSE             13.51319    R-Square     0.3804
             Dependent Mean       29.05000    Adj R-Sq     0.3460
             Coeff Var            46.51701


                              Parameter Estimates

                                 Parameter       Standard
     Variable      DF             Estimate          Error    t Value    Pr > |t|

     Intercept      1             10.14726        6.43915       1.58      0.1325
     x              1              0.58432        0.17577       3.32      0.0038
```

Example 2.2 6
Regression: x=c*y+d

The REG Procedure
Model: MODEL1
Dependent Variable: x

Number of Observations Read	20
Number of Observations Used	20

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2248.40919	2248.40919	11.05	0.0038
Error	18	3662.14081	203.45227		
Corrected Total	19	5910.55000			

Root MSE	14.26367	R-Square	0.3804
Dependent Mean	32.35000	Adj R-Sq	0.3460
Coeff Var	44.09171		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	13.43775	6.52207	2.06	0.0541
y	1	0.65102	0.19584	3.32	0.0038