```
*  CORRIGE DE L'EXERCICE CHAPITRE 4 - EXERCICE 5
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.
. * Tout d'abord s'assurer d'avoir ouvert le fichier de données stata C4EX5 avant d'ouvrir
le do.fileC4EX5qui est fichier programme.
.
. * Attention Pour l'exercice 5 il est également utilisé le fichier Excel de données C4EX4.
.
. *  Une fois le fichier de données ouvert ainsi que le do-file apppuyer sur Run (Execute en
haut à droite de la barre de menu du dofile)
. *  pour démarrer.
.
. * Toutefois il est possible en sélectionnant les parties du programme de l'exécuter pas à
pas afin de voir apparaître pas à pas les
. * différents résultats.
.
.                                   *CHAPITRE 4 EXERCICE 5
.                                                                   * Méthide de sélection de
variables explicatives
.
. * 1ere méthode (un peu longue...)
.
. *Il s'agit de réaliser les 15 équations proposant les 15 combinaisons possibles avec les
vatiables x1, x2, x3 et x4 pour choisir
. * la meilleur estimation en fonction des critères d'information (Akaiké, Schwartz).
. * A chaque fois après la régression, il faut demander les valeurs des critères ( avec le
code "esta ic").
.
. *Les équations à 1 variable
. regres y x1

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(1, 8)         =   1759.14
       Model |  165.746227         1  165.746227   Prob > F        =    0.0000
    Residual |  .753758641         8   .09421983   R-squared       =    0.9955
-------------+----------------------------------   Adj R-squared   =    0.9949
       Total |  166.499986         9  18.4999984   Root MSE        =    .30695

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1178415   .0028096    41.94   0.000     .1113625    .1243204
       _cons |  -1.245267   .3762207    -3.31   0.011    -2.112833   -.3777002
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -1.263045       2    6.526089   7.131259
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x2

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(1, 8)         =    234.38
       Model |  161.004546         1  161.004546   Prob > F        =    0.0000
    Residual |  5.49543971         8  .686929964   R-squared       =    0.9670
-------------+----------------------------------   Adj R-squared   =    0.9629
       Total |  166.499986         9  18.4999984   Root MSE        =    .82881

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x2 |    .326873   .0213509    15.31   0.000     .2776377    .3761082
       _cons |   2.118167   .8191656     2.59   0.032     .2291679    4.007166
```

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------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -11.19605       2    26.39211   26.99728
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(1, 8)         =    157.16
       Model |  158.434997         1  158.434997   Prob > F        =    0.0000
    Residual |  8.06498806         8  1.00812351   R-squared       =    0.9516
-------------+----------------------------------   Adj R-squared   =    0.9455
       Total |  166.499986         9  18.4999984   Root MSE        =    1.0041

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x3 |   .5164114   .0411933    12.54   0.000     .4214193    .6114034
       _cons |  -38.51904   4.201378    -9.17   0.000    -48.20743   -28.83064
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -13.11412       2    30.22824   30.83341
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(1, 8)         =    348.14
       Model |  162.759877         1  162.759877   Prob > F        =    0.0000
    Residual |  3.74010803         8  .467513504   R-squared       =    0.9775
-------------+----------------------------------   Adj R-squared   =    0.9747
       Total |  166.499986         9  18.4999984   Root MSE        =    .68375

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x4 |   .6632432   .0355464    18.66   0.000      .581273    .7452135
       _cons |  -53.65081   3.632179   -14.77   0.000    -62.02663   -45.27499
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -9.272032       2    22.54406   23.14923
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. *Les équations à 2 variables avec x1
```

```
. regres y x1 x2

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    828.10
       Model |  165.799225         2  82.8996126   Prob > F        =    0.0000
    Residual |  .700760383         7  .100108626   R-squared       =    0.9958
-------------+----------------------------------   Adj R-squared   =    0.9946
       Total |  166.499986         9  18.4999984   Root MSE        =     .3164

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1315059   .0190021     6.92   0.000     .0865731    .1764387
          x2 |  -.0389117   .0534792    -0.73   0.490    -.1653699    .0875465
       _cons |  -1.598613   .6214703    -2.57   0.037    -3.068157   -.1290696
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -.8985135       3    7.797027   8.704782
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x1 x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    802.15
       Model |   165.77666         2  82.8883301   Prob > F        =    0.0000
    Residual |  .723325284         7  .103332183   R-squared       =    0.9957
-------------+----------------------------------   Adj R-squared   =    0.9944
       Total |  166.499986         9  18.4999984   Root MSE        =    .32145

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1257807   .0149223     8.43   0.000     .0904952    .1610663
          x3 |  -.0362983    .066885    -0.54   0.604    -.1944561    .1218596
       _cons |   1.419154   4.925379     0.29   0.782    -10.22752    13.06583
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -1.056979       3    8.113957   9.021713
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x1 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    852.14
       Model |  165.818918         2  82.9094589   Prob > F        =    0.0000
    Residual |  .681067776         7  .097295397   R-squared       =    0.9959
-------------+----------------------------------   Adj R-squared   =    0.9947
       Total |  166.499986         9  18.4999984   Root MSE        =    .31192

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1022706   .0182391     5.61   0.001     .0591419    .1453994
```

```
          x4 |   .0895408   .1035923     0.86   0.416     -.155416    .3344977
       _cons |  -8.364023   8.244755    -1.01   0.344    -27.85977    11.13172
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -.7559926       3    7.511985    8.41974
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. *Les équations à 2 variables avec x2
. regres y x2 x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    136.07
       Model |  162.324613         2  81.1623064   Prob > F        =    0.0000
    Residual |  4.17537262         7  .596481803   R-squared       =    0.9749
-------------+----------------------------------   Adj R-squared   =    0.9678
       Total |  166.499986         9  18.4999984   Root MSE        =    .77232

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x2 |   .2088557   .0817884     2.55   0.038     .0154569    .4022545
          x3 |   .1937766   .1302572     1.49   0.180    -.1142329     .501786
       _cons |  -13.29898   10.39153    -1.28   0.241    -37.87105    11.27309
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -9.822478       3    25.64496   26.55271
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. regres y x2 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    283.26
       Model |  164.467779         2  82.2338895   Prob > F        =    0.0000
    Residual |  2.03220657         7  .290315224   R-squared       =    0.9878
-------------+----------------------------------   Adj R-squared   =    0.9843
       Total |  166.499986         9  18.4999984   Root MSE        =    .53881

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x2 |   .1373108    .056612     2.43   0.046     .0034448    .2711768
          x4 |   .3945965   .1142477     3.45   0.011     .1244438    .6647493
       _cons |  -31.24009   9.672898    -3.23   0.014    -54.11286   -8.367324
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -6.222071       3    18.44414    19.3519
```

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------------------------------------------------------------------------------
              Note: N=Obs used in calculating BIC; see [R] BIC note.

. * Les équations à 2 variables avec x3
. regres y x3 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    164.26
       Model |  163.026254         2  81.5131269   Prob > F        =    0.0000
    Residual |  3.47373175         7  .496247393   R-squared       =    0.9791
-------------+----------------------------------   Adj R-squared   =    0.9732
       Total |  166.499986         9  18.4999984   Root MSE        =    .70445

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x3 |  -.1656458   .2260902    -0.73   0.488    -.7002643    .3689726
          x4 |   .8714197   .2864908     3.04   0.019     .1939765    1.548863
       _cons |  -58.03863   7.061944    -8.22   0.000    -74.73748   -41.33979
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -8.902607       3    23.80521   24.71297
------------------------------------------------------------------------------
              Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. *Les équations à 3 variables
. regres y x1 x2 x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(3, 6)         =    492.78
       Model |  165.826958         3  55.2756525   Prob > F        =    0.0000
    Residual |  .673027873         6  .112171312   R-squared       =    0.9960
-------------+----------------------------------   Adj R-squared   =    0.9939
       Total |  166.499986         9  18.4999984   Root MSE        =    .33492

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1387447   .0248301     5.59   0.001     .0779877    .1995017
          x2 |  -.0379303    .056644    -0.67   0.528    -.1765331    .1006726
          x3 |  -.0346712   .0697293    -0.50   0.637    -.2052928    .1359503
       _cons |   .9552902   5.178261     0.18   0.860    -11.71546    13.62604
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -.6966172       4    9.393234   10.60357
------------------------------------------------------------------------------
              Note: N=Obs used in calculating BIC; see [R] BIC note.

. regres y x1 x4 x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(3, 6)         =    985.46
       Model |  166.162757         3  55.3875858   Prob > F        =    0.0000
    Residual |  .337228115         6  .056204686   R-squared       =    0.9980
-------------+----------------------------------   Adj R-squared   =    0.9970
       Total |  166.499986         9  18.4999984   Root MSE        =    .23708
```

```
------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |     .10364   .0138737     7.47   0.000     .0696924    .1375876
          x4 |   .3185646   .1215445     2.62   0.040     .0211558    .6159734
          x3 |  -.1883462   .0761491    -2.47   0.048    -.3746764   -.0020159
       _cons |   -12.7468   6.512113    -1.96   0.098    -28.68136     3.18777
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144   2.758519       4    2.482963   3.693303
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

. regres y x1 x2 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(3, 6)         =    506.38
       Model |  165.844968         3   55.281656   Prob > F        =    0.0000
    Residual |  .655017402         6  .109169567   R-squared       =    0.9961
-------------+----------------------------------   Adj R-squared   =    0.9941
       Total |  166.499986         9  18.4999984   Root MSE        =    .33041

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |    .114955   .0323655     3.55   0.012     .0357596    .1941505
          x2 |  -.0284088   .0581563    -0.49   0.643    -.1707121    .1138945
          x4 |   .0739674   .1142691     0.65   0.541     -.205639    .3535738
       _cons |   -7.38386   8.960917    -0.82   0.441    -29.31043    14.54271
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion

------------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+----------------------------------------------------------------
           . |         10 -28.25144  -.5609925       4    9.121985   10.33233
------------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

. regress y x2 x3 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(3, 6)         =    270.95
       Model |      165.28         3  55.0933334   Prob > F        =    0.0000
    Residual |  1.21998537         6  .203330895   R-squared       =    0.9927
-------------+----------------------------------   Adj R-squared   =    0.9890
       Total |  166.499986         9  18.4999984   Root MSE        =    .45092

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x2 |   .1637814   .0491942     3.33   0.016     .0434076    .2841552
          x3 |  -.3003369   .1502703    -2.00   0.093    -.6680351    .0673613
          x4 |   .7202575   .1889219     3.81   0.009     .2579823    1.182533
       _cons |  -34.87546   8.296955    -4.20   0.006    -55.17738   -14.57355
------------------------------------------------------------------------------

. estat ic

Akaike's information criterion and Bayesian information criterion
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-----------------------------------------------------------------------------
       Model |        Obs  ll(null)  ll(model)      df         AIC        BIC
-------------+---------------------------------------------------------------
           . |         10 -28.25144  -3.670654       4    15.34131   16.55165
-----------------------------------------------------------------------------
               Note: N=Obs used in calculating BIC; see [R] BIC note.

.
. * Un fois les estimations réalisées on constate qu'il faut éliminer celles dont un ou
plusieurs ratios de Student sont inféreurs
. * au seuil critique (t=2.30).
.
. *On peut donc conserver les modèles M1, M2, M3 M4, M9 et M13.
.
. *Parmi les 6 équations restantes on sélectionne celles dont le critère de Akaiké/Schartz
est le plus faible.
. * Il s'agit du modèle M13 avec x1, X4 et X3 comme variables explicatives.
.
. *2ème méthode : la sélection progressive.
.
. *On cacule les coefficients de corrélation simple entre les variables et on prend la
variable qui a le coefficient le plus élevé
. * et significatif au seuil de 5%.
.
. pwcorr y x1 x2 x3 x4, sig star(5)

             |        y       x1       x2       x3       x4
-------------+---------------------------------------------
           y |   1.0000
             |
             |
          x1 |   0.9977*  1.0000
             |   0.0000
             |
          x2 |   0.9834*  0.9883*  1.0000
             |   0.0000   0.0000
             |
          x3 |   0.9755*  0.9804*  0.9700*  1.0000
             |   0.0000   0.0000   0.0000
             |
          x4 |   0.9887*  0.9877*  0.9695*  0.9918*  1.0000
             |   0.0000   0.0000   0.0000   0.0000
             |

.
. *Il apparait que x1 a le coefficient le plus élevé. Donc on fait 3 estimations :
.
. * x1 et x2 ; x1 et x3; x1 et x4
. regress y x1 x2

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    828.10
       Model |  165.799225         2  82.8996126   Prob > F        =    0.0000
    Residual |  .700760383         7  .100108626   R-squared       =    0.9958
-------------+----------------------------------   Adj R-squared   =    0.9946
       Total |  166.499986         9  18.4999984   Root MSE        =     .3164

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1315059   .0190021     6.92   0.000     .0865731    .1764387
          x2 |  -.0389117   .0534792    -0.73   0.490    -.1653699    .0875465
       _cons |  -1.598613   .6214703    -2.57   0.037    -3.068157   -.1290696
------------------------------------------------------------------------------

. regress y x1 x3

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    802.15
       Model |   165.77666         2  82.8883301   Prob > F        =    0.0000
```

```
    Residual |  .723325284         7  .103332183   R-squared       =    0.9957
-------------+----------------------------------   Adj R-squared   =    0.9944
       Total |  166.499986         9  18.4999984   Root MSE        =    .32145

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1257807   .0149223     8.43   0.000     .0904952    .1610663
          x3 |  -.0362983    .066885    -0.54   0.604    -.1944561    .1218596
       _cons |   1.419154   4.925379     0.29   0.782    -10.22752    13.06583
------------------------------------------------------------------------------

. regress y x1 x4

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(2, 7)         =    852.14
       Model |  165.818918         2  82.9094589   Prob > F        =    0.0000
    Residual |  .681067776         7  .097295397   R-squared       =    0.9959
-------------+----------------------------------   Adj R-squared   =    0.9947
       Total |  166.499986         9  18.4999984   Root MSE        =    .31192

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1022706   .0182391     5.61   0.001     .0591419    .1453994
          x4 |   .0895408   .1035923     0.86   0.416     -.155416    .3344977
       _cons |  -8.364023   8.244755    -1.01   0.344    -27.85977    11.13172
------------------------------------------------------------------------------


.
. *Dans les trois modèles la nouvelle variable explicative n'est jamais significative. On
garde le modèle avec juste x1 (M1)
.
. * 3ème méthode : La régression pas à pas.
.
. * Dans le cas présent elle est identique à la précédente, puisque on doit commencer avec 1
variable, puis 2, puis 3.
. *Mais ici après x1 plus aucune variable n'est significative.
.
. * 4ème méthode : La régression par étage.
.
. *On cacule les coefficients de corrélation simple entre les variables et on prend la
variables qui à le coefficient
. *le plus élevé (et significatif au seuil de 5%!) c'est à dire une fois de plus x1.
. * On réalise la régression et on récupère les résidus de la régression notés "e1".
.
. regress y x1

      Source |       SS           df       MS      Number of obs   =        10
-------------+----------------------------------   F(1, 8)         =   1759.14
       Model |  165.746227         1  165.746227   Prob > F        =    0.0000
    Residual |  .753758641         8   .09421983   R-squared       =    0.9955
-------------+----------------------------------   Adj R-squared   =    0.9949
       Total |  166.499986         9  18.4999984   Root MSE        =    .30695

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   .1178415   .0028096    41.94   0.000     .1113625    .1243204
       _cons |  -1.245267   .3762207    -3.31   0.011    -2.112833   -.3777002
------------------------------------------------------------------------------

. predict e1, re

. mkmat e1, mat(résidus)

. mat list résidus

résidus[10,1]
              e1
 r1  -.12379023
```

```
 r2   .47521931
 r3  -.12709492
 r4   .23656105
 r5  -.42467204
 r6   .00803627
 r7  -.41883597
 r8   .07734121
 r9    .0172853
r10   .27995005

.
. * Calculer les coefficients de corrélation simple entre les résidus et les variables : e1
et x2, e1 et x3 et e1 et x4.
. * Le coefficient de corrélation entre e1 et x1 est forcément nul.
.
. pwcorr e1 x2 x3 x4, sig star(5)

             |       e1       x2       x3       x4
-------------+------------------------------------
          e1 |   1.0000
             |
             |
          x2 |  -0.0404   1.0000
             |   0.9117
             |
          x3 |  -0.0396   0.9700*  1.0000
             |   0.9135   0.0000
             |
          x4 |   0.0486   0.9695*  0.9918*  1.0000
             |   0.8939   0.0000   0.0000
             |

.
. *Les autres coefficients ne sont pas significativement différents de zéro, la procédure
s'arrête.
.
end of do-file
```