```
* Tout d'abord s'assurer d'avoir ouvert le fichier de données stata C5EX2 avant d'ouvrir le
do.fileC5EX2 qui est fichier programme.
. *  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 démar
> rer
.
. * 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.
.
. *Attention c'est le même fichier C5EX1 pour l'exercice 1 et 2
.
. *         CHAPITRE 5 EXERCICE 2
. * Test d'indépendance des erreurs
.
.
. * On fait la régression complète de y par rapport à x1 x2 et x3 et on récupère les résidus
de la regression
. regress y x1 x2 x3

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(3, 16)        =     81.95
       Model |  2496.75144         3  832.25048    Prob > F        =    0.0000
    Residual |  162.493922        16  10.1558701   R-squared       =    0.9389
-------------+----------------------------------   Adj R-squared   =    0.9274
       Total |  2659.24536        19  139.960282   Root MSE        =    3.1868

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   3.897408   .4003251     9.74   0.000     3.048757    4.746059
          x2 |   .4043652   .0613514     6.59   0.000     .2743061    .5344244
          x3 |  -.8788858   .2402165    -3.66   0.002    -1.388122   -.3696496
       _cons |  -242.7951   26.79996    -9.06   0.000    -299.6085   -185.9817
------------------------------------------------------------------------------

. predict residus, re

.
. **********************************Première possibilité
.
. * Etape 1 : l'estimation du rho et définition de la variable temps
. tsset date
        time variable:  date, 1 to 20
                delta:  1 unit

. regress residus L1.residus

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(1, 17)        =      3.71
       Model |  28.8458639         1  28.8458639   Prob > F        =    0.0709
    Residual |  132.139272        17  7.77289838   R-squared       =    0.1792
-------------+----------------------------------   Adj R-squared   =    0.1309
       Total |  160.985136        18  8.94361868   Root MSE        =     2.788

------------------------------------------------------------------------------
     residus |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     residus |
         L1. |   .4648458   .2413007     1.93   0.071    -.0442542    .9739459
             |
       _cons |   .0654004   .6430733     0.10   0.920    -1.291366    1.422167
------------------------------------------------------------------------------

.
. gen rho=_b[L1.residus]

. display rho
.46484584

.
```

```
. * Etape 2 : tranformation des variables et régressions en quasi-différences
. * Calcul des quasi-différences
. gen dy=y-rho*L1.y
(1 missing value generated)

. gen dx1=x1-rho*L1.x1
(1 missing value generated)

. gen dx2=x2-rho*L1.x2
(1 missing value generated)

. gen dx3=x3-rho*L1.x3
(1 missing value generated)

.
. * Faire la régression de dy par rapport à dx1 dx2 dx3
.
. regress dy dx1 dx2 dx3

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(3, 15)        =     56.79
       Model |  1343.30651         3  447.768835   Prob > F        =    0.0000
    Residual |  118.263433        15  7.88422888   R-squared       =    0.9191
-------------+----------------------------------   Adj R-squared   =    0.9029
       Total |  1461.56994        18    81.19833   Root MSE        =    2.8079

------------------------------------------------------------------------------
          dy |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dx1 |   3.593677   .5830733     6.16   0.000     2.350886    4.836468
         dx2 |   .4390191   .0713648     6.15   0.000     .2869087    .5911296
         dx3 |  -.5145971   .3370979    -1.53   0.148    -1.233104      .20391
       _cons |  -135.5131   18.38346    -7.37   0.000    -174.6965   -96.32964
------------------------------------------------------------------------------


.
. * Calcul ldu terme constant
. gen ahat=_b[_cons]/(1- rho)

. display ahat
-253.22246


.
. * ******************************Deuxième possibilité
.
. *Etape 1
. * On estime rho2 à partir du DW. On fait d'abord la regression de base
. regress y x1 x2 x3

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(3, 16)        =     81.95
       Model |  2496.75144         3   832.25048   Prob > F        =    0.0000
    Residual |  162.493922        16  10.1558701   R-squared       =    0.9389
-------------+----------------------------------   Adj R-squared   =    0.9274
       Total |  2659.24536        19  139.960282   Root MSE        =    3.1868

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   3.897408   .4003251     9.74   0.000     3.048757    4.746059
          x2 |   .4043652   .0613514     6.59   0.000     .2743061    .5344244
          x3 |  -.8788858   .2402165    -3.66   0.002    -1.388122   -.3696496
       _cons |  -242.7951   26.79996    -9.06   0.000    -299.6085   -185.9817
------------------------------------------------------------------------------


.
. * On demande le calcul de la statistique à Stata (calcul du DW fait à l'exercice C5EX1),
ici c'est le calcul automatique de la statistique
. * fait par stata qui est utilisé
. estat dwatson
```

```
Durbin-Watson d-statistic(  4,    20) =  1.053792

. gen dw=r(dw)

. display dw
1.0537925


.
. *(NB : On peut en écrivant regdw y x1 x2 x3 obtenir directement la régression et la
statistique)
.
. * Faire le calcul de rho2 à partir de dw
. gen rho2= 1 -(dw/2)

. display rho2
.47310376


.
. * Etape 2
. *Transformer les variables et régresser en quasi différences
. gen dy2=y-rho2*L1.y
(1 missing value generated)

. gen dx12=x1-rho2*L1.x1
(1 missing value generated)

. gen dx22=x2-rho2*L1.x2
(1 missing value generated)

. gen dx32=x3-rho2*L1.x3
(1 missing value generated)


.
. * Faire la nouvelle régression
. regress dy2 dx12 dx22 dx32

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(3, 15)        =     56.61
       Model |  1331.41363         3  443.804542   Prob > F        =    0.0000
    Residual |  117.595547        15  7.83970315   R-squared       =    0.9188
-------------+----------------------------------   Adj R-squared   =    0.9026
       Total |  1449.00917        18  80.5005097   Root MSE        =    2.7999

------------------------------------------------------------------------------
         dy2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        dx12 |   3.580223   .5836738     6.13   0.000     2.336152    4.824295
        dx22 |   .4404901   .0713997     6.17   0.000     .2883053    .5926749
        dx32 |  -.5030346   .3369914    -1.49   0.156    -1.221315    .2152456
       _cons |  -133.4094   18.14246    -7.35   0.000    -172.0791   -94.73966
------------------------------------------------------------------------------


.
. * Calculer le terme constant
. gen ahat2=_b[_cons]/(1- rho2)

. display ahat2
-253.19859


.
.
. ******************************** Estimation récursive du vecteur a et rho (méthode de
Cochrane_ Orcutt)
.
. * Estimation d'un modèle autoregressif d'ordre 1, selon la méthode
.  prais y x1 x2 x3 , corc

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.4623
Iteration 2:  rho = 0.6884
Iteration 3:  rho = 0.7834
```

```
Iteration 4:  rho = 0.8037
Iteration 5:  rho = 0.8091
Iteration 6:  rho = 0.8107
Iteration 7:  rho = 0.8112
Iteration 8:  rho = 0.8113
Iteration 9:  rho = 0.8114
Iteration 10:  rho = 0.8114
Iteration 11:  rho = 0.8114
Iteration 12:  rho = 0.8114
Iteration 13:  rho = 0.8114

Cochrane-Orcutt AR(1) regression -- iterated estimates

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(3, 15)        =     52.71
       Model |  1039.70694         3  346.568981   Prob > F        =    0.0000
    Residual |  98.6225176        15  6.57483451   R-squared       =    0.9134
-------------+----------------------------------   Adj R-squared   =    0.8960
       Total |  1138.32946        18  63.2405255   Root MSE        =    2.5641

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   3.142389   .5538504     5.67   0.000     1.961885    4.322894
          x2 |   .4975571   .0674666     7.37   0.000     .3537554    .6413588
          x3 |  -.1440305   .2954437    -0.49   0.633    -.7737537    .4856928
       _cons |  -250.3442   37.21227    -6.73   0.000    -329.6603   -171.0281
-------------+----------------------------------------------------------------
         rho |   .8113769
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.053792
Durbin-Watson statistic (transformed) 2.149342

.
.  * On note que dans ce cas rho=0,81
.
.  * La méthode de balayage proposé par Stata se fait avec la syntaxe
.  regdw y x1 x2 x3

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(3, 16)        =     81.95
       Model |  2496.75144         3   832.25048   Prob > F        =    0.0000
    Residual |  162.493922        16  10.1558701   R-squared       =    0.9389
-------------+----------------------------------   Adj R-squared   =    0.9274
       Total |  2659.24536        19  139.960282   Root MSE        =    3.1868

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   3.897408   .4003251     9.74   0.000     3.048757    4.746059
          x2 |   .4043652   .0613514     6.59   0.000     .2743061    .5344244
          x3 |  -.8788858   .2402165    -3.66   0.002    -1.388122   -.3696496
       _cons |  -242.7951   26.79996    -9.06   0.000    -299.6085   -185.9817
------------------------------------------------------------------------------

Durbin-Watson Statistic =  1.053792

.  hlu y x1 x2 x3
Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.9999
Iteration 2:  rho = 0.5000
Iteration 3:  rho = 0.7499
Iteration 4:  rho = 0.8749
Iteration 5:  rho = 0.9374
Iteration 6:  rho = 0.9687
Iteration 7:  rho = 0.9843
Iteration 8:  rho = 0.9921
Iteration 9:  rho = 0.9960
Iteration 10:  rho = 0.9979

(Hildreth-Lu regression)
```

```
      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(3, 15)        =     47.63
       Model |  1029.22903         3  343.076344   Prob > F        =    0.0000
    Residual |  108.047021        15  7.20313471   R-squared       =    0.9050
-------------+----------------------------------   Adj R-squared   =    0.8860
       Total |  1137.27605        18   63.182003   Root MSE        =    2.6839

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          x1 |   3.084713   .5411141     5.70   0.000     1.947874    4.221551
          x2 |   .5015116   .0654091     7.67   0.000     .3640923     .638931
          x3 |  -.1306599   .2725148    -0.48   0.637    -.7031922    .4418724
      _inter |  -29.58569   332.7072    -0.09   0.930    -728.5775    669.4061
-------------+----------------------------------------------------------------
         rho |     0.9989     0.0026   389.27   0.000       0.9935      1.0043
------------------------------------------------------------------------------

Durbin-Watson statistic (original)    1.053792
Durbin-Watson statistic (transformed) 2.397374

.
.
end of do-file

. exit, clear
```