```
*CORRIGE DE L'EXERCICE CHAPITRE 11-EXERCICE 1
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.
. * Tout d'abord s'assurer d'avoir ouvert le fichier de données stata C11EX1 avant d'ouvrir
le do.fileC11EX1 qui est le 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 démarrer le programme. Il sera exécuté dans son intégralité.
.
. * 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 11 EXERCICE 1
.                                 * Test de cointégration et modèles à correction d'erreur
.
.  gen temps=(_n)

.  tsset temps
        time variable:  temps, 1 to 30
                delta:  1 unit


.
.  */// L'étape 1 consiste à tester les séries en termes de stationnarité
.
.  ******* LES TESTS ADF
.
.  ********variable x  - test ADF
.
. * Modèle 3 variable x
. dfuller x, trend  regress

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.825            -4.343            -3.584            -3.230
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9635

------------------------------------------------------------------------------
D.x          |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |
         L1. |  -.0902225   .1093259    -0.83   0.417    -.3149451    .1345001
      _trend |   .0379352   .0262415     1.45   0.160     -.016005    .0918754
       _cons |   -.167203   .3800334    -0.44   0.664    -.9483728    .6139668
------------------------------------------------------------------------------


.
. * Il y a une racine et la tendance n'a pas de coefficient significatif
.
. * Modèle 2 variable x
. dfuller x,  regress

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.049            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9543

------------------------------------------------------------------------------
         D.x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
           x |
         L1. |  -.0046012   .0937284    -0.05   0.961     -.196916    .1877136
             |
       _cons |   .2583855   .2451241     1.05   0.301    -.2445676    .7613387
------------------------------------------------------------------------------


.
.  * Il y a une racine et la dérive n'a pas de coefficient significatif
.
. * modèle 1 variable x
.
.  dfuller x, noconstant regress

Dickey-Fuller test for unit root                   Number of obs   =        29

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              0.814            -2.654            -1.950            -1.602

------------------------------------------------------------------------------
         D.x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |
         L1. |   .0586876    .072116     0.81   0.423    -.0890353    .2064104
------------------------------------------------------------------------------


.
. * La présence de la racine est confirmée. On passera la variable en différence première
. gen Dx=d.x
(1 missing value generated)

. corrgram Dx

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0084  -0.0093   .00225  0.9622          |                   |
2        0.0760   0.0796   .19436  0.9074          |                   |
3        0.1337   0.1332   .81291  0.8464          |-                  |-
4       -0.2515  -0.3258   3.0875  0.5433        --|                --|
5        0.2049   0.1652   4.6601  0.4588          |-                  |-
6       -0.2378  -0.4193   6.8709  0.3330         -|                ---|
7       -0.0454   0.2348   6.9551  0.4336          |                   |-
8        0.2558   0.2489    9.756  0.2826          |--                 |-
9       -0.2118   0.0262   11.773  0.2264         -|                   |
10       0.1591   0.0855    12.97  0.2254          |-                  |
11      -0.1245   0.1214   13.743  0.2475          |                   |
12      -0.1556  -0.0145   15.023  0.2402         -|                   |


.
.  ********variable y - test ADF
.
.  * Modèle 3 variable y
. dfuller y, trend  regress

Dickey-Fuller test for unit root                   Number of obs   =        29

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.057            -4.343            -3.584            -3.230
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1169

------------------------------------------------------------------------------
D.y          |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
           y |
         L1. |   -.597207   .1953637    -3.06   0.005    -.9987829   -.1956311
       _trend |   .0524158   .0338273     1.55   0.133    -.0171172    .1219489
       _cons |   6.099241   2.139199     2.85   0.008     1.702053    10.49643
------------------------------------------------------------------------------

.
. * Il y a une racine et la tendance n'a pas de coefficient significatif
.
. * Modèle 2 variable y
. dfuller y,  regress

Dickey-Fuller test for unit root                   Number of obs   =        29

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.669            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0796

------------------------------------------------------------------------------
         D.y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           y |
         L1. |  -.5143047    .192708    -2.67   0.013    -.9097089   -.1189004
             |
       _cons |   5.950262    2.19178     2.71   0.011       1.4531    10.44742
------------------------------------------------------------------------------

.
.  * Il y a une racine et la dérive n'a pas de coefficient significatif
.
.  * Modèle 1 variable y
.  dfuller y, regress noconstant

Dickey-Fuller test for unit root                   Number of obs   =        29

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.169            -2.654            -1.950            -1.602

------------------------------------------------------------------------------
         D.y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           y |
         L1. |   .0045994   .0271949     0.17   0.867    -.0511068    .0603055
------------------------------------------------------------------------------

.
. * La présence de la racine est confirmée. On passera la variable en différence première
.
. gen Dy=d.y
(1 missing value generated)

. corrgram Dy

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.3433  -0.3822    3.785  0.0517        --|               ---|
2       -0.1926  -0.4020   5.0195  0.0813         -|               ---|
3        0.0643  -0.2044   5.1624  0.1603          |                 -|
4        0.0705  -0.0873   5.3412  0.2540          |                  |
5        0.2184   0.5247   7.1274  0.2113          |-                 |----
6       -0.3223  -0.1691   11.187  0.0828        --|                 -|
7       -0.0732  -0.2845   11.405  0.1219          |                --|
8        0.3268   0.6748   15.979  0.0427          |--                |-----
```

```
9       -0.0774  -0.1110   16.248  0.0619          |                 |
10      -0.2082  -0.8213   18.298  0.0501        -|            ------|
11       0.0303   0.4725   18.344  0.0739          |                 |---
12       0.1116   0.6512   19.003  0.0885          |                 |-----

.
.
.  ******* LES TESTS P.Perron
.
.  ********variable x - test PPerron
.
.  pperron x, trend lag(2) regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.528           -23.012           -18.204           -15.792
 Z(t)             -0.804            -4.343            -3.584            -3.230
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9654

------------------------------------------------------------------------------
x            |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |
         L1. |   .9097775   .1093259     8.32   0.000     .6850549      1.1345
      _trend |   .0379352   .0262415     1.45   0.160     -.016005    .0918754
       _cons |   -.167203   .3800334    -0.44   0.664    -.9483728    .6139668
------------------------------------------------------------------------------

.
.  * Il y a racine unitaire et le trend n'est pas significatif
.
.
.  pperron x,  lag(2) regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.305           -17.472           -12.628           -10.280
 Z(t)             -0.112            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9483

------------------------------------------------------------------------------
           x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |
         L1. |   .9953988   .0937284    10.62   0.000      .803084    1.187714
             |
       _cons |   .2583855   .2451241     1.05   0.301    -.2445676    .7613387
------------------------------------------------------------------------------

.
.  * Il y a racine unitaire et la dérive n'est pas significatif
.
.   pperron x,  lag(2) noconstant regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
```

```
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.795          -12.060            -7.364            -5.332
 Z(t)              0.879           -2.654            -1.950            -1.602

------------------------------------------------------------------------------
           x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |
         L1. |   1.058688    .072116    14.68   0.000     .9109647     1.20641
------------------------------------------------------------------------------


.
.  * Il y a racine unitaire il faut passer en différence première
.
.
.   ********variable y - test PPerron
.
.  pperron y, trend lag(2) regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -16.108          -23.012           -18.204           -15.792
 Z(t)             -2.958           -4.343            -3.584            -3.230
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1441

------------------------------------------------------------------------------
y            |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           y |
         L1. |    .402793   .1953637     2.06   0.049     .0012171    .8043689
      _trend |   .0524158   .0338273     1.55   0.133    -.0171172    .1219489
       _cons |   6.099241   2.139199     2.85   0.008     1.702053    10.49643
------------------------------------------------------------------------------


.
.  * Il y a racine unitaire et le trend n'est pas significatif
.
.
.  pperron y,  lag(2) regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -14.159          -17.472           -12.628           -10.280
 Z(t)             -2.597           -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0936

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           y |
         L1. |   .4856953    .192708     2.52   0.018     .0902911    .8810996
             |
       _cons |   5.950262    2.19178     2.71   0.011       1.4531    10.44742
------------------------------------------------------------------------------


.
.  * Il y a racine unitaire et la dérive n'est pas significatif
.
```

```
.   pperron y,  lag(2) noconstant regress

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)             0.310           -12.060            -7.364            -5.332
 Z(t)               0.618            -2.654            -1.950            -1.602

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           y |
         L1. |   1.004599   .0271949    36.94   0.000     .9488932    1.060306
------------------------------------------------------------------------------


.
.  * Il y a racine unitaire il faut passer en différence première
.
.
.   ******* LES TESTS KPSS
.
.  ********variable x - test Kpss
.
. kpss x, trend maxlag(2)

KPSS test for x

Maxlag = 2
Autocovariances weighted by Bartlett kernel

Critical values for H0: x is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .538
    1             .3
    2           .219


.
. kpss x,  maxlag(2) notrend

KPSS test for x

Maxlag = 2
Autocovariances weighted by Bartlett kernel

Critical values for H0: x is level stationary

10%: 0.347  5% : 0.463  2.5%: 0.574  1% : 0.739

Lag order    Test statistic
    0           1.32
    1           .736
    2           .533


.
.
.  * Il y a racine unitaire il faut passer en différence première
.
.    ********variable y - test Kpss
.
. kpss y, trend maxlag(2)

KPSS test for y

Maxlag = 2
```

```
Autocovariances weighted by Bartlett kernel

Critical values for H0: y is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .322
    1           .239
    2           .201


.
. kpss y,  maxlag(2) notrend

KPSS test for y

Maxlag = 2
Autocovariances weighted by Bartlett kernel

Critical values for H0: y is level stationary

10%: 0.347  5% : 0.463  2.5%: 0.574  1% : 0.739

Lag order    Test statistic
    0           .667
    1            .48
    2           .391


.
. *
. * Dans la mesure où tous les tests convergent, on effecture la régression mco de y/x en
niveau.
. * Il faut récupérer les résidus de la relation de long terme et vérifier qu'ils sont
stationnaires
.
.  regress y x

      Source |       SS           df       MS      Number of obs   =        30
-------------+----------------------------------   F(1, 28)        =     40.62
       Model |  44.7902879         1  44.7902879   Prob > F        =    0.0000
    Residual |  30.8731933        28  1.10261405   R-squared       =    0.5920
-------------+----------------------------------   Adj R-squared   =    0.5774
       Total |  75.6634813        29  2.60908556   Root MSE        =    1.0501

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |   .5515968   .0865449     6.37   0.000     .3743176    .7288761
       _cons |   10.38444   .2504303    41.47   0.000     9.871454    10.89742
------------------------------------------------------------------------------

.  predict residus, re

.
.  dfuller residus

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.303            -3.723            -2.989           -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

.  * Ils sont stationnaires nous procédons au MCE avec les résidus retardés
.
. regress Dy Dx L.residus

      Source |       SS           df       MS      Number of obs   =        29
```

```
-------------+----------------------------------   F(2, 26)        =     19.91
       Model |  46.6541505         2  23.3270752   Prob > F        =    0.0000
    Residual |  30.4691568        26  1.17189065   R-squared       =    0.6049
-------------+----------------------------------   Adj R-squared   =    0.5745
       Total |  77.1233073        28  2.75440383   Root MSE        =    1.0825

------------------------------------------------------------------------------
          Dy |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          Dx |   .6173472   .2072745     2.98   0.006     .1912883    1.043406
             |
     residus |
         L1. |  -1.018732   .1986301    -5.13   0.000    -1.427022   -.6104423
             |
       _cons |  -.0344263   .2075232    -0.17   0.870    -.4609964    .3921438
------------------------------------------------------------------------------


.
. *Le coefficient du résidu retardé (la force de rappel) est bien significatif et négatif.
La représentatrion du MCE est validée.
.
.
.
.
.
.   dfuller residus

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.303            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

.   dfuller residus, noconstant

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.399            -2.654            -1.950            -1.602

.
.  pperron residus

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -25.220           -17.472           -12.628           -10.280
 Z(t)             -5.374            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

.  pperron residus, noconstant

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(rho)          -25.258          -12.060          -7.364          -5.332
 Z(t)             -5.487           -2.654          -1.950          -1.602

.
.
end of do-file

. exit, clear
```