```
> library(urca)
> library("urca", lib.loc="~/R/win-library/3.4")
> unitrootTable(trend=c("nc"), statistic=c("t"))
     0.010  0.025  0.050  0.100 0.900 0.950 0.975 0.990
 25 -2.661 -2.272 -1.955 -1.609 0.925 1.337 1.701 2.139
 50 -2.612 -2.249 -1.948 -1.613 0.906 1.309 1.660 2.073
100 -2.588 -2.238 -1.944 -1.615 0.897 1.296 1.641 2.043
250 -2.574 -2.232 -1.942 -1.616 0.891 1.288 1.630 2.026
500 -2.570 -2.229 -1.941 -1.616 0.890 1.286 1.627 2.021
Inf -2.565 -2.227 -1.941 -1.617 0.888 1.284 1.624 2.015
attr(,"control")
     table      trend  statistic
"unitroot"       "nc"        "t"
```

คำสั่งที่ใช้ทดสอบ ADF

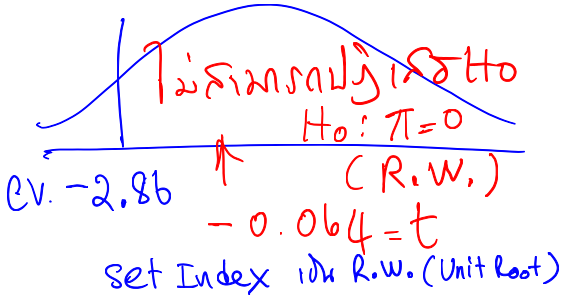
```
ur.df(y, type = c("none", "drift", "trend"), lags = 1,
      selectlags = c("Fixed", "AIC", "BIC"))
```

none คือไม่มี constant,

drift คือมี constant

trend คือมี constant และ trend

```
> set.df<-ur.df(set$index, type=c("drift"), lags=3)
> summary(set.df)

###############################################
# Augmented Dickey-Fuller Test Unit Root Test #
###############################################

Test regression drift


Call:
lm(formula = z.diff ~ z.lag.1 + 1 + z.diff.lag)

Residuals:
     Min       1Q   Median       3Q      Max
-108.576   -4.735   -0.160    4.833   74.430

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.566e-01  4.023e-01   0.638  0.52353
z.lag.1     -3.776e-05  5.944e-04  -0.064  0.94934
z.diff.lag1  4.574e-02  1.660e-02   2.756  0.00588 **
```



```
z.diff.lag2  4.148e-02  1.660e-02   2.498  0.01252 *
z.diff.lag3 -1.464e-02  1.660e-02  -0.882  0.37808
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.355 on 3633 degrees of freedom
Multiple R-squared:  0.004086, Adjusted R-squared:  0.00299
F-statistic: 3.727 on 4 and 3633 DF,  p-value: 0.004955

Value of test-statistic is: -0.0635 1.1288

Critical values for test statistics:
      1pct  5pct 10pct
tau2 -3.43 -2.86 -2.57
phi1  6.43  4.59  3.78

> set.aic.df<-ur.df(set$index, type=c("drift"), selectlags=c("AIC"))
> summary(set.aic.df)

###############################################
# Augmented Dickey-Fuller Test Unit Root Test #
###############################################

Test regression drift


Call:
lm(formula = z.diff ~ z.lag.1 + 1 + z.diff.lag)

Residuals:
     Min       1Q   Median       3Q      Max
-108.378   -4.738   -0.109    4.825   74.270

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 2.304e-01  4.020e-01   0.573   0.5666
z.lag.1     9.704e-06  5.936e-04   0.016   0.9870
z.diff.lag  4.701e-02  1.658e-02   2.836   0.0046 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.36 on 3637 degrees of freedom
Multiple R-squared:  0.002211, Adjusted R-squared:  0.001662
F-statistic: 4.029 on 2 and 3637 DF,  p-value: 0.01787

Value of test-statistic is: 0.0163 1.1612

Critical values for test statistics:
      1pct  5pct 10pct
tau2 -3.43 -2.86 -2.57
phi1  6.43  4.59  3.78
```

ในตัวอย่างนี้ทั้ง AIC และ BIC เลือก lag เท่ากับ 1

```
> set1d.aic.df<-ur.df(diff(set$index), type=c("drift"), selectlags=c("AIC"))
> summary(set1d.aic.df)


Value of test-statistic is: -39.956 798.2402

Critical values for test statistics:
      1pct  5pct 10pct
tau2 -3.43 -2.86 -2.57
phi1  6.43  4.59  3.78

ur.pp(x, type = c("Z-alpha", "Z-tau"), model = c("constant", "trend"),
      lags = c("short", "long"), use.lag = NULL)
```

```
> set.pp<-ur.pp(set$index, type=c("Z-tau"), model=c("constant"), lags="short")
> summary(set.pp)

###################################
# Phillips-Perron Unit Root Test #
###################################

Test regression with intercept


Call:
lm(formula = y ~ y.l1)

Residuals:
     Min       1Q   Median       3Q      Max
-108.667   -4.775   -0.121    4.801   69.161

Coefficients:
             Estimate Std. Error  t value Pr(>|t|)
(Intercept) 0.2056212  0.4021455    0.511    0.609
y.l1        1.0000700  0.0005936 1684.637   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 9.368 on 3639 degrees of freedom
Multiple R-squared:  0.9987,   Adjusted R-squared:  0.9987
F-statistic: 2.838e+06 on 1 and 3639 DF,  p-value: < 2.2e-16


Value of test-statistic, type: Z-tau  is: 0.0153

         aux. Z statistics
Z-tau-mu            0.5786

Critical values for Z statistics:
                     1pct      5pct     10pct
critical values -3.43515 -2.862853 -2.567495
```