Cap4 - Processos não estacionarios - Series Temporais

11/09/2019

Importando banco de dados.

Usando a serie "preço da cesta básica - São Paulo - (1958 - 2019)", e a transformando em série temporal.

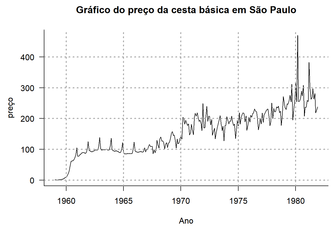
```
yt<- ts(dados$Folha, frequency = 12, start = c(1959, 1));yt
```

```
##         Jan    Feb    Mar    Apr    May    Jun    Jul    Aug    Sep    Oct
## 1959   0.32   0.39   0.51   0.64   0.87   1.10   1.48   1.93   2.60   3.60
## 1960   9.61  12.80  19.67  28.75  42.17  59.84  61.99  62.98  65.47  71.90
## 1961  78.13  77.68  81.66  83.38  87.56  88.76  89.14  89.20  86.66  90.13
## 1962  96.41  95.03  93.05  91.85  93.87  94.97  97.10  97.83  97.61  97.14
## 1963 101.62  97.11  98.39  98.20  98.25  98.67 100.64  98.10  97.79  97.99
## 1964  99.99  95.68  94.76  93.11  95.42  94.21  93.65  91.50  89.41  90.39
## 1965  89.15  84.90  86.10  85.04  86.34  86.06  86.51  85.77  85.78  87.34
## 1966  94.76  92.27  91.54  90.22  91.48  91.89  93.66  91.95  90.94  93.37
## 1967 100.00  98.43 109.13 116.22 109.82 108.84 109.21  85.80  98.42  89.49
## 1968 114.40 104.33 133.33 140.31 127.01 127.69 122.69 101.35 117.96 122.05
## 1969 123.67 133.24 150.89 158.07 144.76 146.91 131.20 104.52 133.82 118.14
## 1970 140.33 133.84 203.70 200.19 181.74 194.60 184.17 177.55 182.48 146.66
## 1971 162.33 147.92 206.63 217.23 207.72 218.92 205.04 191.45 194.85 183.98
## 1972 169.70 171.42 203.62 240.09 191.14 207.15 207.24 179.66 196.67 145.95
## 1973 134.61 154.41 170.74 185.45 194.50 209.24 182.30 161.37 175.34 127.57
## 1974 206.24 194.59 183.04 191.40 191.35 207.95 191.00 178.19 182.31 135.49
## 1975 176.17 218.35 181.89 204.07 214.00 218.60 216.45 189.22 209.01 162.13
## 1976 188.85 210.78 204.89 215.87 218.60 231.48 224.49 221.02 202.28 163.69
## 1977 182.74 217.67 187.75 212.34 217.92 225.61 229.46 231.55 208.51 176.73
## 1978 200.01 232.69 221.77 222.80 237.71 234.92 240.25 219.67 223.85 177.87
## 1979 249.95 235.02 229.65 248.45 246.30 256.53 275.61 254.85 311.47 195.33
## 1980 314.94 254.36 470.16 255.57 256.64 265.61 288.60 274.37 307.97 208.17
## 1981 258.53 255.43 382.40 295.58 263.25 267.99 297.03 263.54 281.29 218.67
##         Nov    Dec
## 1959   5.54   9.18
## 1960  82.45 104.93
## 1961 102.35 124.97
## 1962 108.59 138.35
## 1963 110.44 136.19
## 1964 100.64 122.15
## 1965  99.49 123.45
## 1966 105.32  91.87
## 1967  99.62 129.37
## 1968 105.99 120.61
## 1969 120.50 135.72
## 1970 153.20 180.94
## 1971 161.03 249.09
## 1972 157.65 168.26
## 1973 177.32 177.59
## 1974 158.49 193.53
## 1975 178.04 203.48
## 1976 179.90 200.02
## 1977 188.02 250.40
## 1978 209.88 271.25
## 1979 233.07 259.37
## 1980 237.50 236.60
## 1981 227.97 237.94
```

Capitulo 8.1 - Pág 45 até 46 - O teste de Dickey-Fuller

Analise Gráfica

Plotando o gráfico e visualizando o comportamento da série.



Simplesmente olhando para o seu gráfico é basicamente impossivel saber se é estacionária ou não. Para testar de uma forma mais formal podemos rodar a regressão da primeira diferença da série contra sua defasagem.O -1, este comando força a regressão através da origem, ou seja, sem intercepto.

```
summary(lm(diff(yt)~lag(yt,-1)[-length(yt)] - 1))
```

```
##
## Call:
## lm(formula = diff(yt) ~ lag(yt, -1)[-length(yt)] - 1)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -208.424   -4.763    2.348   13.611  219.136
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## lag(yt, -1)[-length(yt)] -0.01312    0.01100  -1.192    0.234
##
## Residual standard error: 31.08 on 274 degrees of freedom
## Multiple R-squared:  0.005162,   Adjusted R-squared:  0.001532
## F-statistic: 1.422 on 1 and 274 DF,  p-value: 0.2341
```

1 - Interpretação da regressão

Teste Dickey-Fuller - Pág 48 até 51

1.1 -O que é o teste?

```
summary(ur.df(yt, type='none', lags=0))
```

```
##
## ###############################################
## # Augmented Dickey-Fuller Test Unit Root Test #
## ###############################################
##
## Test regression none
##
##
## Call:
## lm(formula = z.diff ~ z.lag.1 - 1)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -208.424   -4.763    2.348   13.611  219.136
##
## Coefficients:
##         Estimate Std. Error t value Pr(>|t|)
## z.lag.1 -0.01312    0.01100  -1.192    0.234
##
## Residual standard error: 31.08 on 274 degrees of freedom
## Multiple R-squared:  0.005162,   Adjusted R-squared:  0.001532
## F-statistic: 1.422 on 1 and 274 DF,  p-value: 0.2341
##
##
## Value of test-statistic is: -1.1924
##
## Critical values for test statistics:
##       1pct  5pct 10pct
## tau1 -2.58 -1.95 -1.62
```

1.2-interpretação do teste de regressão

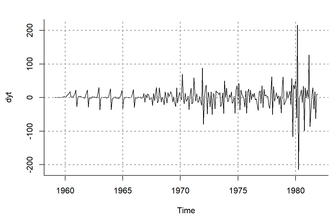
fazendo o teste DF em sua primeira diferença.

```
dyt <- diff(yt)
summary(ur.df(dyt, type='none', lags=0))
```

```
##
## ###############################################
## # Augmented Dickey-Fuller Test Unit Root Test #
## ###############################################
##
## Test regression none
##
##
## Call:
## lm(formula = z.diff ~ z.lag.1 - 1)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -111.732   -8.914    0.658   10.681  186.925
##
## Coefficients:
##         Estimate Std. Error t value Pr(>|t|)
## z.lag.1 -1.47664    0.05322  -27.75   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 27.45 on 273 degrees of freedom
## Multiple R-squared:  0.7382, Adjusted R-squared:  0.7373
## F-statistic: 769.9 on 1 and 273 DF,  p-value: < 2.2e-16
##
##
## Value of test-statistic is: -27.7467
##
## Critical values for test statistics:
##       1pct  5pct 10pct
## tau1 -2.58 -1.95 -1.62
```

1.3 -interpretação do resultado

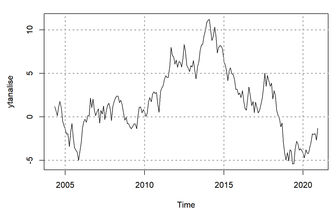
```
plot(dyt,
  ylab=expression(dyt),
  main='',
  bty='l',
col='black')
grid(col='darkgrey', lwd=2)
```



1.4 - interpretação do gráfico se der,acho que nem tem no livro

A série yt é um passeio aleatório.

```
ytanalise = ts(cumsum(rnorm(200)), end=c(2020,12), freq=12)
plot(ytanalise)
grid(col='darkgrey', lwd=2)
```



1.5 - interpretação do gráfico