

# TP6\_Analysis\_Dejous

*Alexandre Dejous*

*5/17/2019*

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.   :  2.00
## 1st Qu.:12.0    1st Qu.: 26.00
##  Median :15.0    Median : 36.00
##   Mean  :15.4    Mean   : 42.98
## 3rd Qu.:19.0    3rd Qu.: 56.00
##   Max.  :25.0    Max.    :120.00
```

## Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

## Part A: Stationnary Analysis

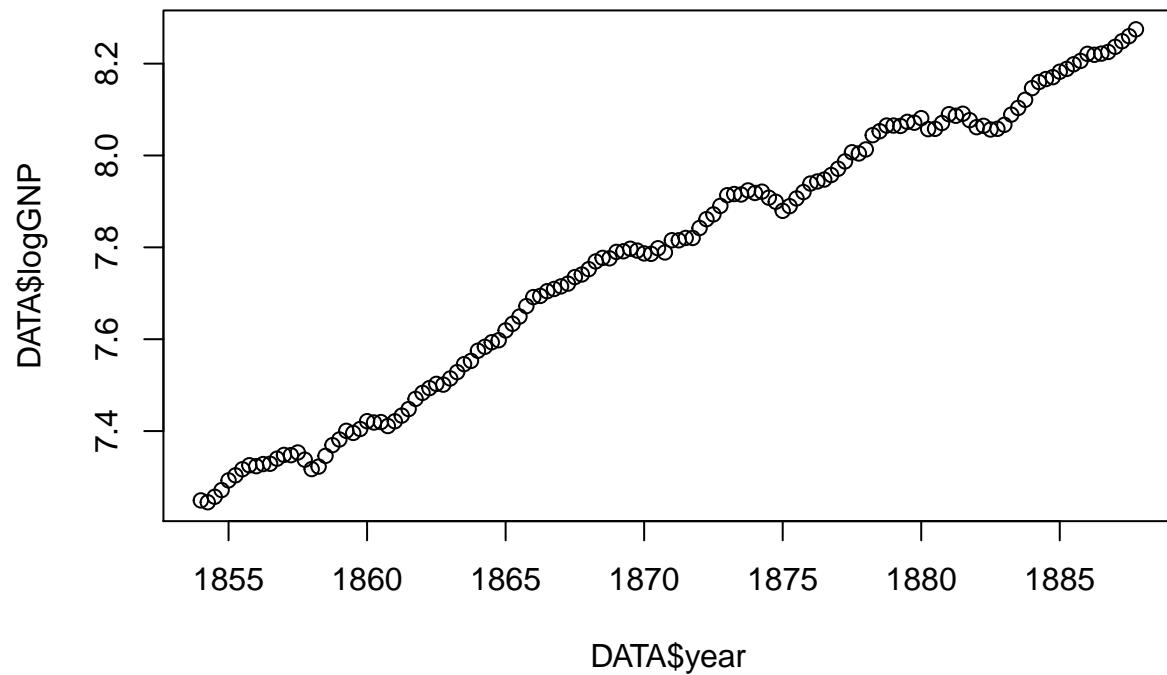
### Question 1 and 2:

```
setwd("D:/Documents/A2/Data/TP6_Analysis")
library(tseries)

## Registered S3 method overwritten by 'xts':
##   method      from
##   as.zoo.xts zoo

## Registered S3 method overwritten by 'quantmod':
##   method      from
##   as.zoo.data.frame zoo

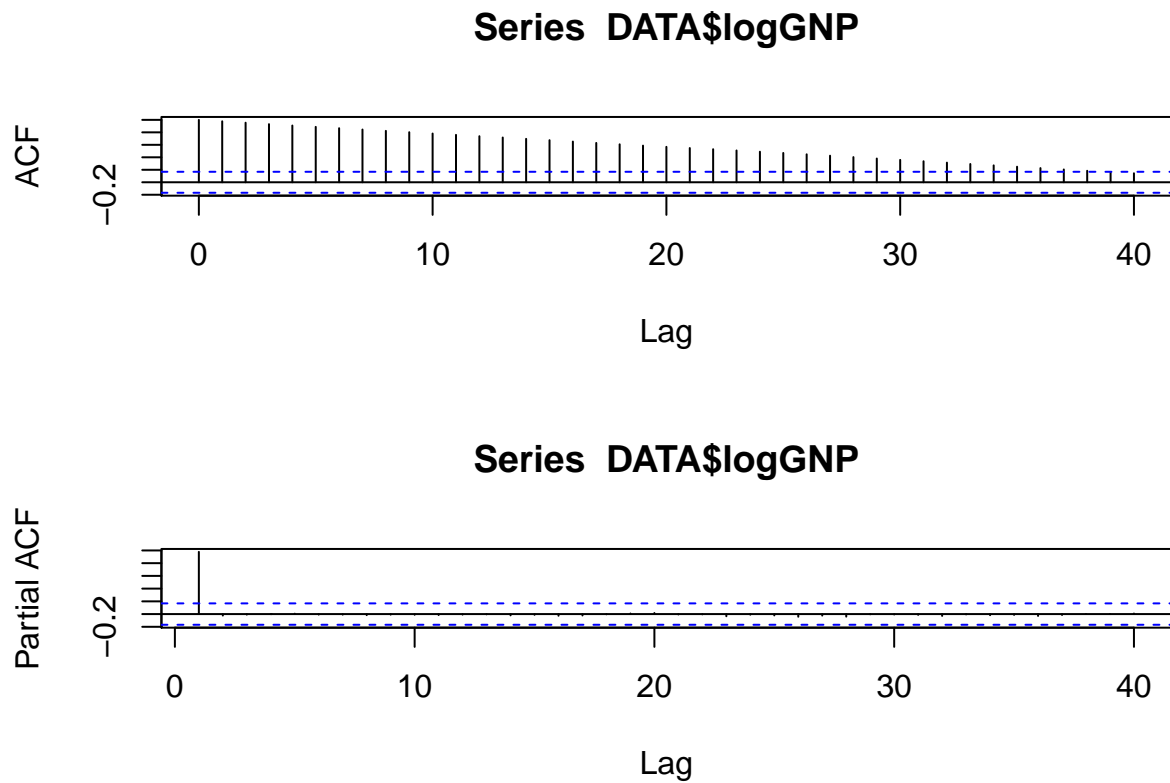
data(USEconomic)
logGNP = as.vector(USEconomic[,2])
year = seq(1854,1887.75,0.25)
DATA = data.frame(year,logGNP)
plot(DATA$year, DATA$logGNP)
```



### Question 3

In a stationary time series, the ensemble mean and the time average of a sample path are approximately equal. For a strict stationary time series, all the observations are drawn from the same distribution, for a weak stationary time series, we expect only the observations to come from distributions with the same mean, variance and covariance. In the plot we just drew, we visually assess that the samples values increase gradually on average on a significant number of samples, which should not happen if the samples were taken from the same distribution. We conclude that the time series is not stationary.

#### Question 4



It seems that the ACF is steadily decreasing, which could indicate that logGNP follows a trend. The PACF indicates us that this trend can be modeled with an autoregressive model of order 1.

#### Question 5: