

Main

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Introduction

Librairies

```
library(tseries)

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

library(readr)
```

Import et délimitation du dataset

```
valeurs_mensuelles <- read_delim("valeurs_mensuelles.csv", delim = ";", col_types = cols())
vm <- valeurs_mensuelles[,-c(1, 2, 3), ]
colnames(vm) <- c("date", "value", "code")
vm <- vm[nrow(vm):1, ]
vm$value <- as.numeric(vm$value)
vm$diff <- c(NA, diff(vm$value))

str(vm)

## tibble [421 x 4] (S3: tbl_df/tbl/data.frame)
##   $ date : chr [1:421] "1990-01" "1990-02" "1990-03" "1990-04" ...
##   $ value: num [1:421] 107.3 96.4 102.6 78.5 71.7 ...
##   $ code : chr [1:421] "A" "A" "A" "A" ...
##   $ diff : num [1:421] NA -10.97 6.2 -24.12 -6.81 ...

head(vm)

## # A tibble: 6 x 4
##   date      value code    diff
##   <chr>    <dbl> <chr>  <dbl>
## 1 1990-01  107.   A      NA
## 2 1990-02   96.4  A     -11.0
## 3 1990-03  103.   A       6.2
## 4 1990-04   78.5  A     -24.1
## 5 1990-05   71.6  A     -6.81
## 6 1990-06   80.8  A       9.20
```

Part I : The Data

1. What does the chosen series represent ? (sector, potential data processing, logarithmic transformation, etc.)

La série représente la production

2. Transform the series to make it stationary if necessary (differentiate it, correct the deterministic trend, etc.). Thoroughly justify your choices.

```
serie_ts <- ts(vm$value, start = c(1990, 01), frequency = 12)
diff_series <- ts(vm$diff, start = c(1990, 02), frequency = 12)
# Test de Dickey-Fuller augmenté
diff_series <- na.omit(diff_series)
adf_test <- adf.test(diff_series, alternative="stationary")
```

```
## Warning in adf.test(diff_series, alternative = "stationary"): p-value smaller
## than printed p-value
```

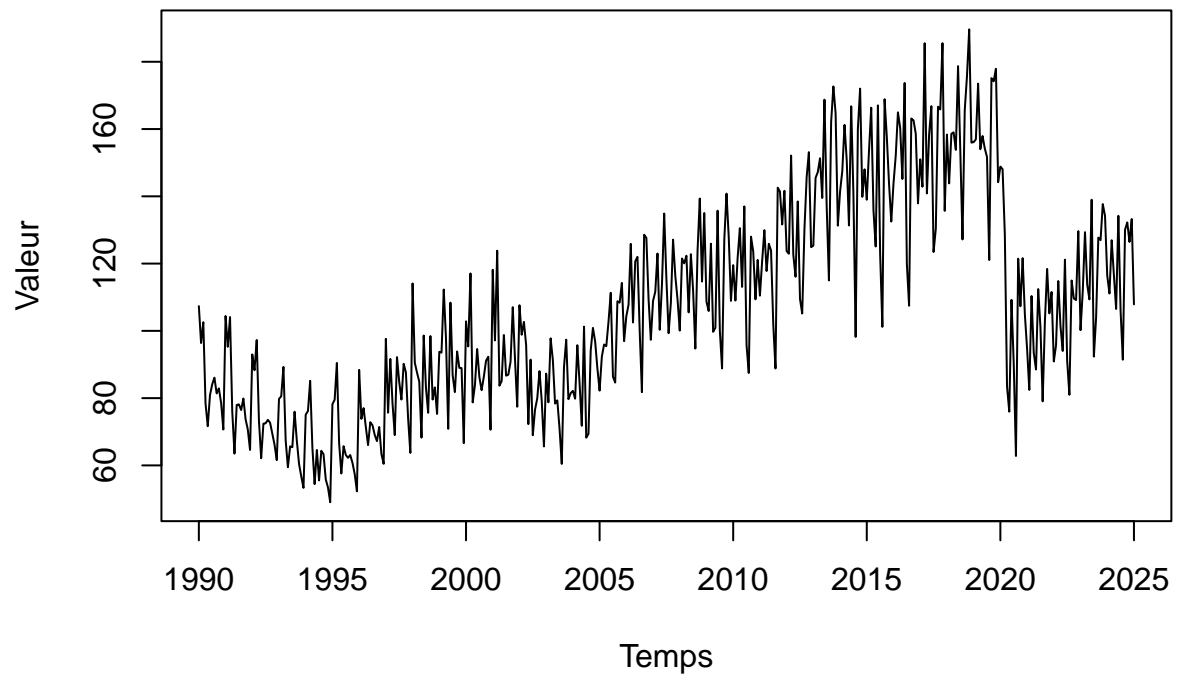
```
print(adf_test)
```

```
##
## Augmented Dickey-Fuller Test
##
## data: diff_series
## Dickey-Fuller = -10.457, Lag order = 7, p-value = 0.01
## alternative hypothesis: stationary
```

3. Graphically represent the chosen series before and after transforming it.

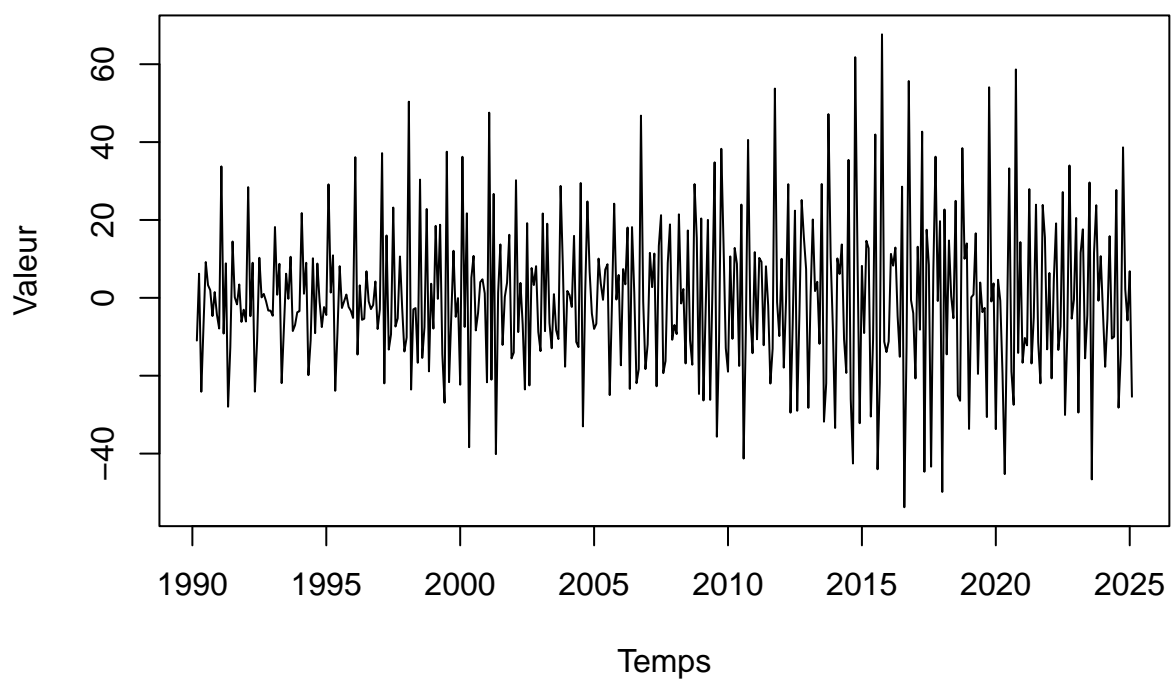
```
plot(serie_ts, main="Série Temporelle", xlab="Temps", ylab="Valeur")
```

Série Temporelle



```
plot(diff_series, main="Série Temporelle Différenciée", xlab="Temps", ylab="Valeur")
```

Série Temporelle Différenciée



2. Transform the series to make it stationary if necessary (differentiate it, correct the deterministic trend, etc.). Thoroughly justify your choices.