Time Series Data Analysis using R

group

2022-11-15

AIM:TIME (AIM:TIME) SERIES ANALYSIS USING R DATASET:AIRMILES,On this R-data statistics page, you will find information about the airmiles data set which pertains to Passenger Miles on Commercial US Airlines, 1937–1960. The airmiles data set is found in the datasets R package

```
## Load the Forecast Package into RStudio
library(forecast)
```

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

```
## Load the iris Dataset and View Its Class
data("airmiles")
class(airmiles)
```

```
## [1] "ts"
```

```
## Display
airmiles
```

```
## Time Series:
## Start = 1937
## End = 1960
## Frequency = 1
##  [1]   412   480   683  1052  1385  1418  1634  2178  3362  5948  6109  5981
## [13]  6753  8003 10566 12528 14760 16769 19819 22362 25340 25343 29269 30514
```

```
## check on our date values
start(airmiles)
```

```
## [1] 1937    1
```

```
end(airmiles)
```

```
## [1] 1960    1
```

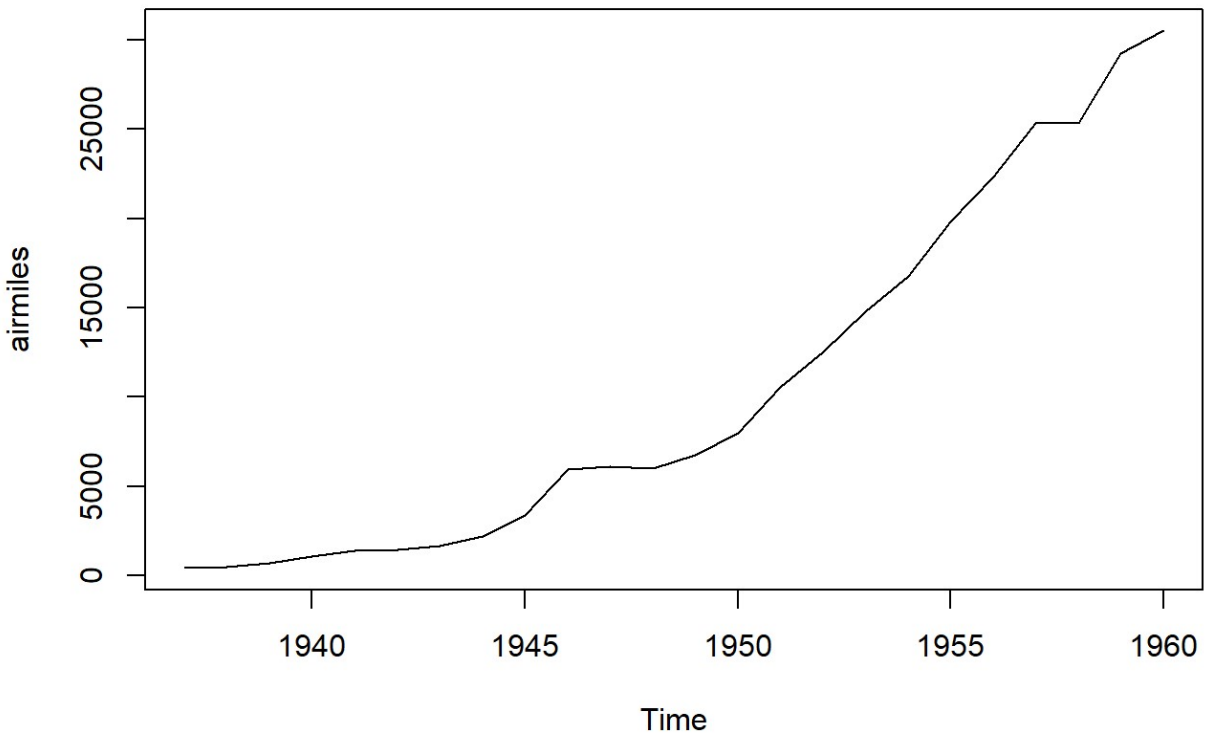
```
# Find out If There Are Any Missing Values
sum(is.na(airmiles))
```

```
## [1] 0
```

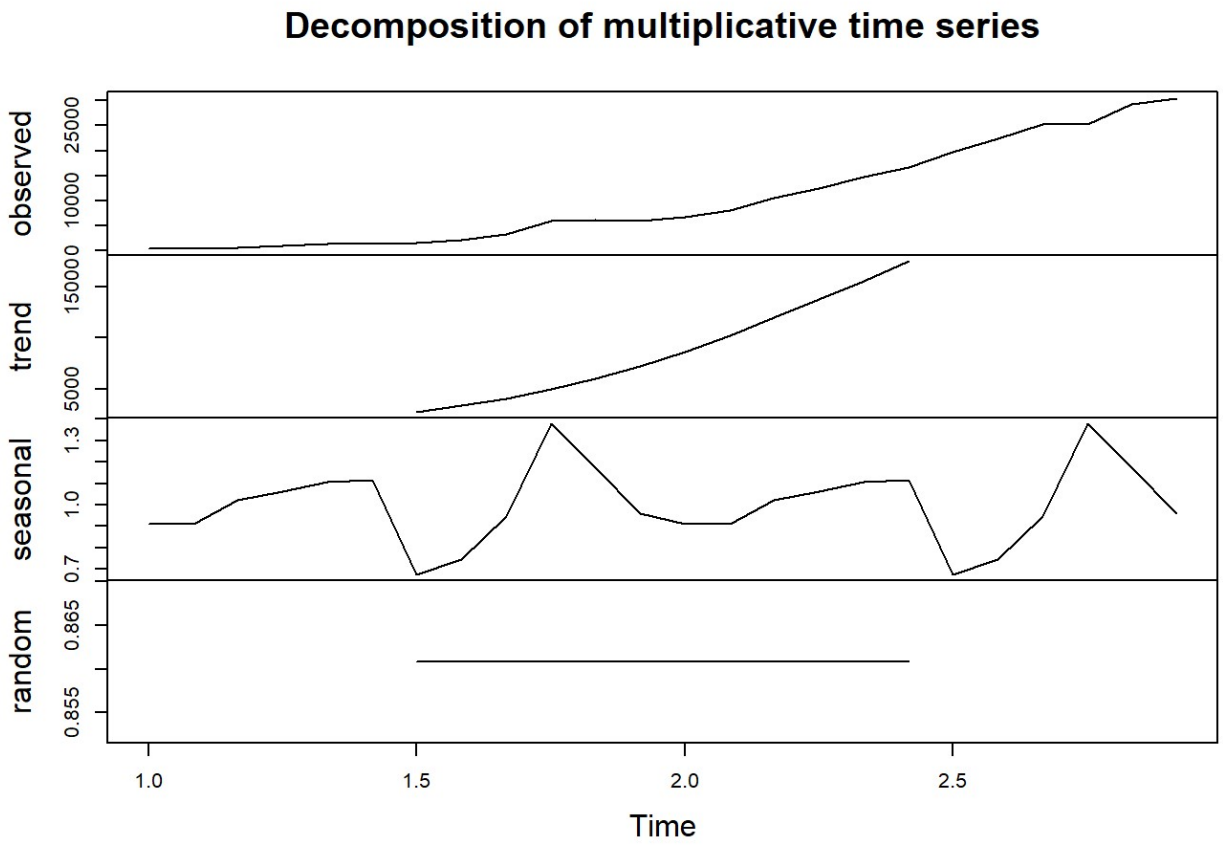
```
## Check the Summary of the Dataset
summary(airmiles)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##     412    1580    6431   10528   17532   30514
```

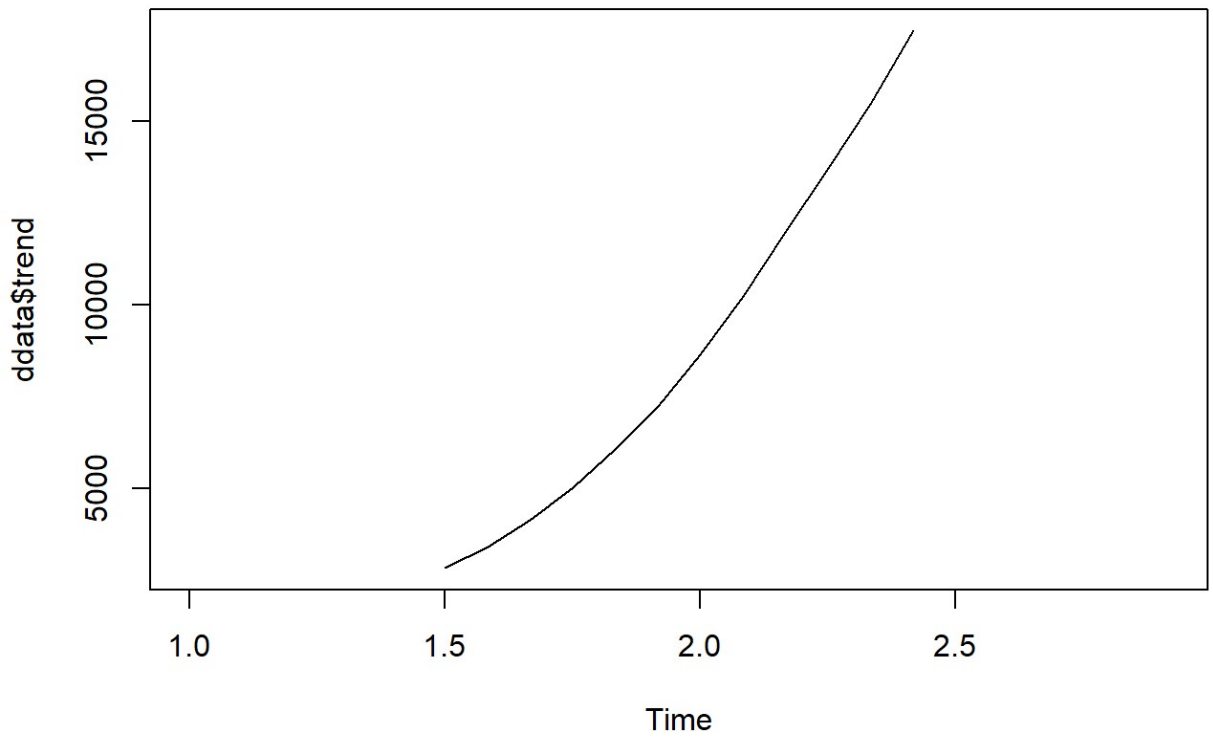
```
##Plot the Dataset
plot(airmiles)
```



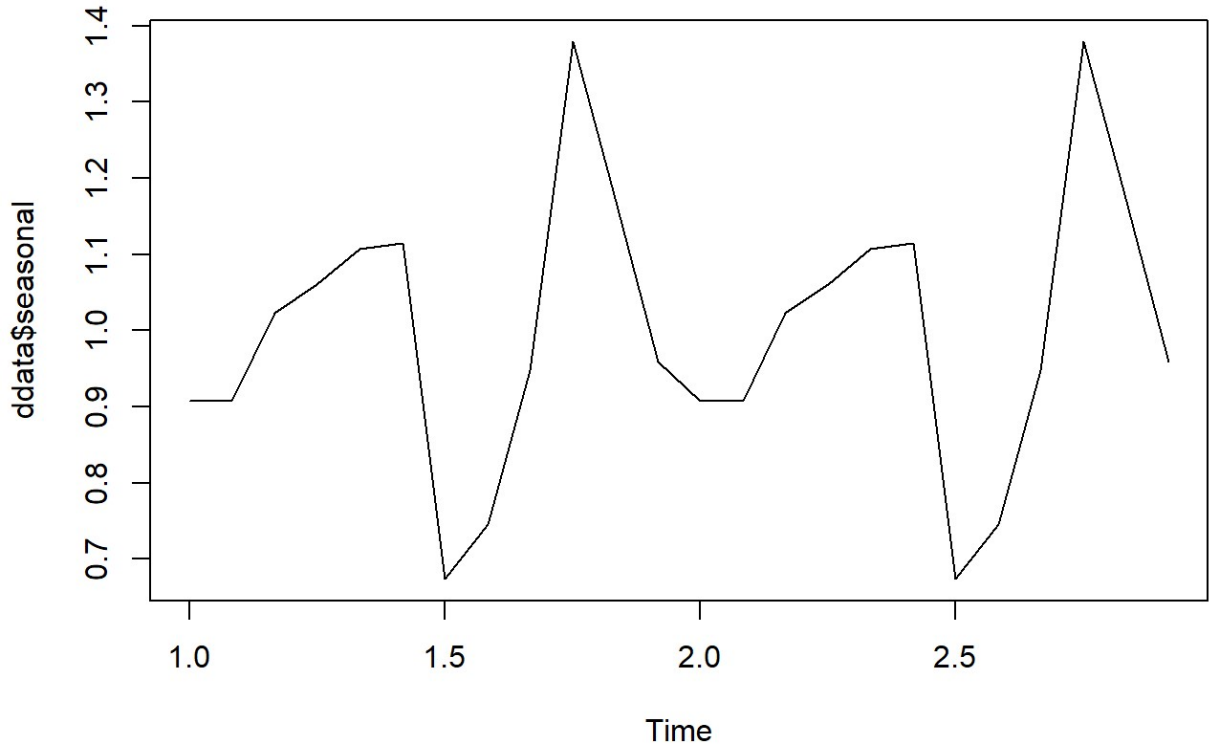

```
## Decompose the Data Into Four Components
tsdata <- ts(airmiles, frequency = 12)
ddata <- decompose(tsdata, "multiplicative")
plot(ddata)
```



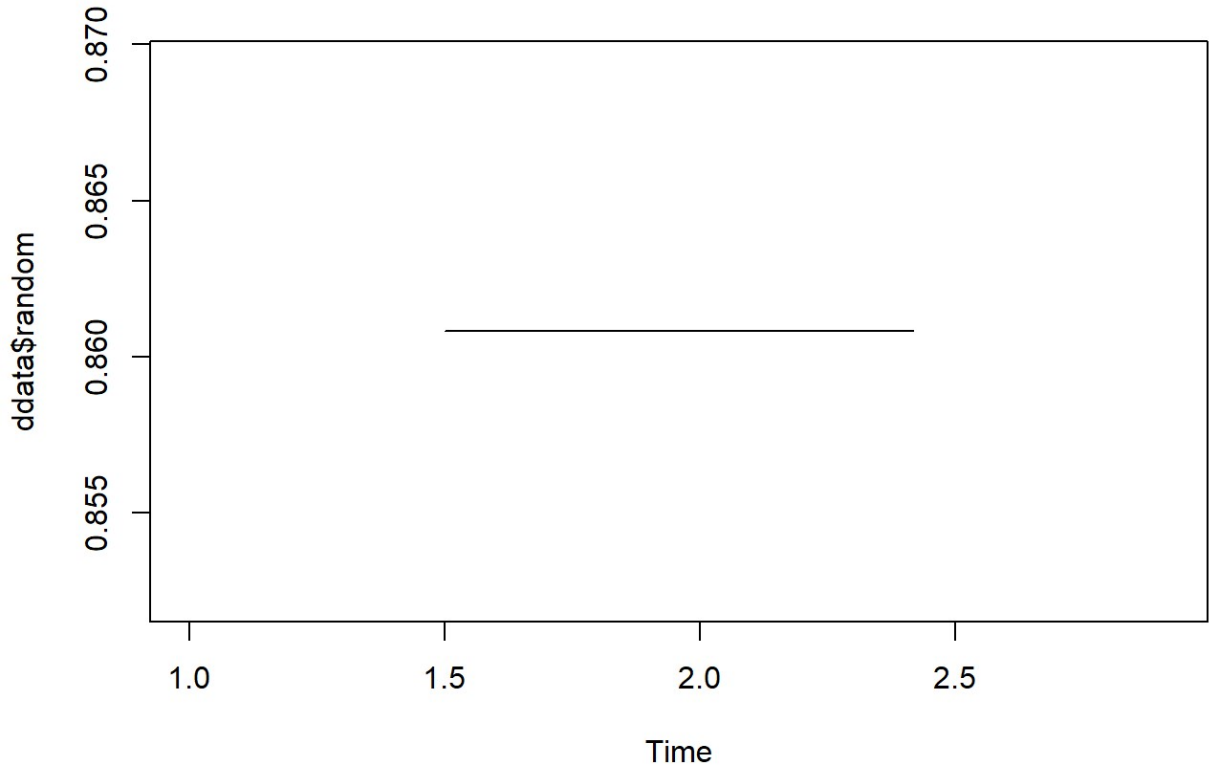

```
## Plot the Different Components Individually
plot(ddata$trend)
```



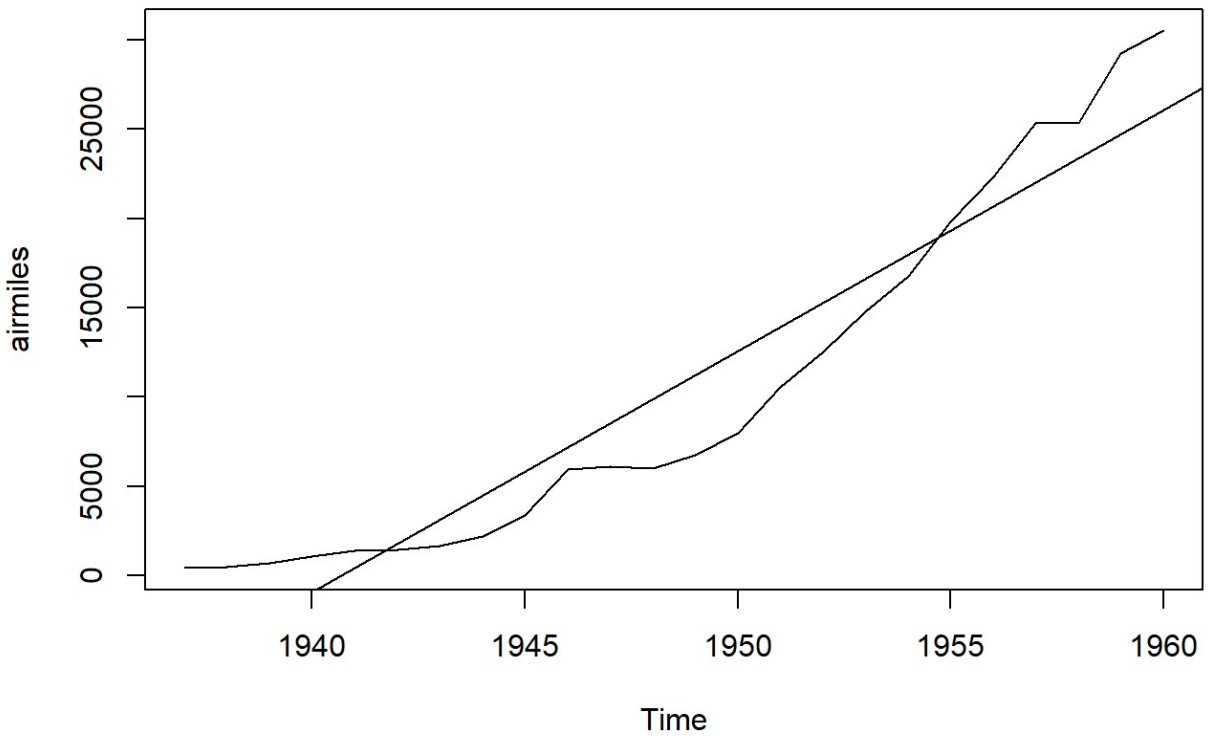

```
plot(ddata$seasonal)
```



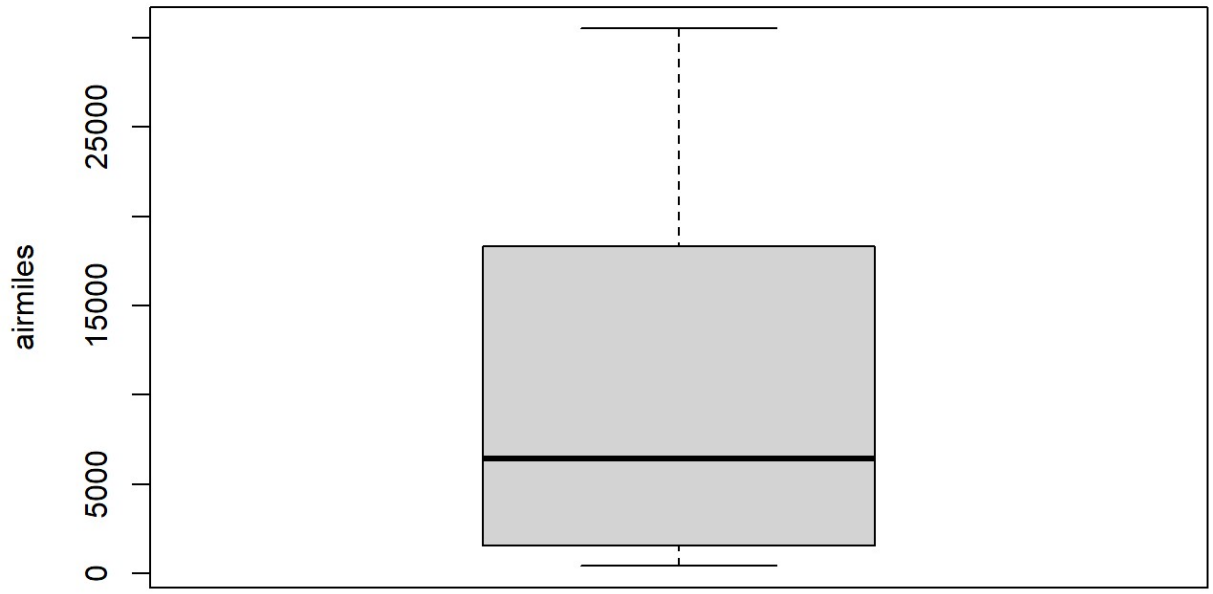

```
plot(ddata$random)
```




```
## Plot a Trendline on the Original Dataset
plot(airmiles)
abline(reg=lm(airmiles~time(airmiles)))
```




```
## Create a Box Plot by Cycle
boxplot(airmiles~cycle(airmiles, xlab="Date", ylab = "Passenger Numbers
(1000's)", main = "Monthly air passengers boxplot from 1949-1960"))
```



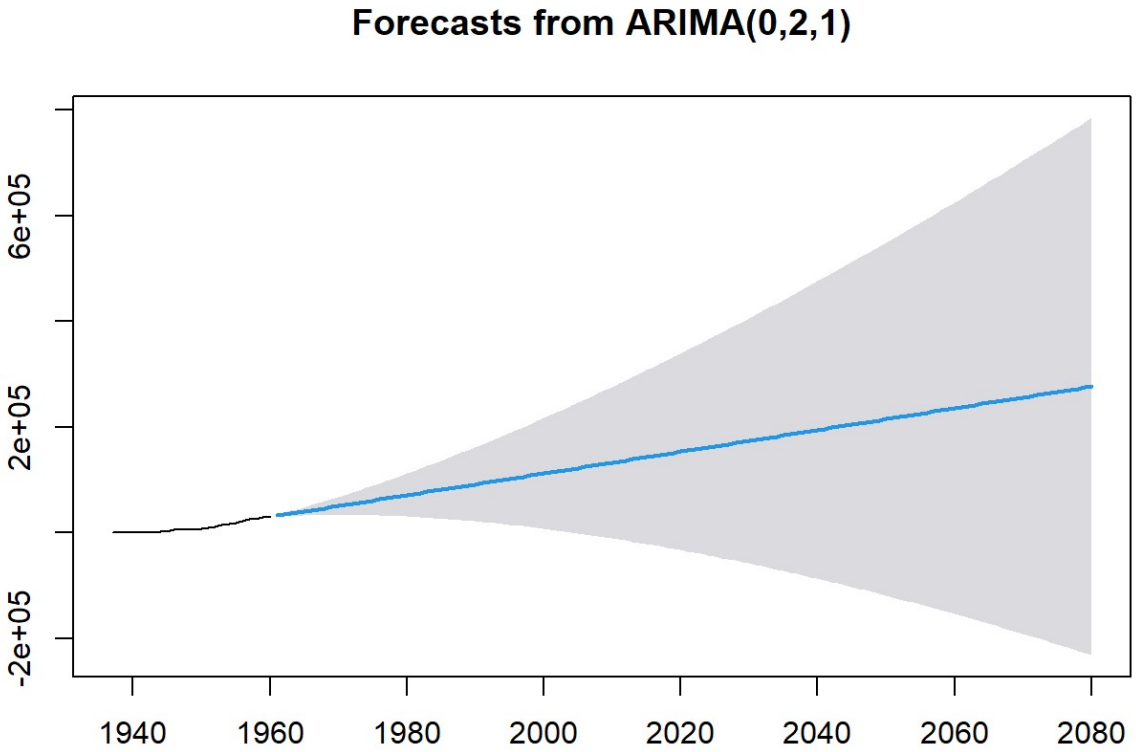
s, xlab = "Date", ylab = "Passenger Numbers\n(1000's)", main = "Monthly air passengers boxplot

```
## Build the ARIMA Model Using auto.arima() Function
mymodel <-auto.arima(airmiles)
mymodel
```

```
## Series: airmiles
## ARIMA(0,2,1)
##
## Coefficients:
##           ma1
##       -0.7031
## s.e.   0.1273
##
## sigma^2 = 1234546:  log likelihood = -185.33
## AIC=374.67   AICc=375.3   BIC=376.85
```

```
## Plot the Residuals
plot.ts(mymodel$residuals)
```


```
# #Forecast the Values for the Next 10 Years
myforecast <- forecast(mymodel, level=c(95), h=10*12)
plot(myforecast)
```




```
Box.test(mymodel$resid, lag=5, type="Ljung-Box")
```

```
##
##  Box-Ljung test
##
## data:  mymodel$resid
## X-squared = 4.7529, df = 5, p-value = 0.4468
```

```
```