

Walmart Sales Forecasting

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- Running all the required libraries
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Running all the required libraries

```
library(forecast)
```

```
## Warning: package 'forecast' was built under R version 3.4.4
```

```
## Warning in as.POSIXlt.POSIXct(Sys.time()): unknown timezone 'zone/tz/2018c'.
## 1.0/zoneinfo/America/New_York'
```

```
library(tseries)
```

```
## Warning: package 'tseries' was built under R version 3.4.4
```

```
#install.packages("fpp")
library(fpp)
```

```
## Loading required package: fma
```

```
## Loading required package: expsmooth
```

```
## Loading required package: lmtest
```

```
## Warning: package 'lmtest' was built under R version 3.4.4
```

```
## Loading required package: zoo
```

```
## Warning: package 'zoo' was built under R version 3.4.3
```

```
##  
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':  
##  
##     as.Date, as.Date.numeric
```

```
#install.packages("sqldf")  
library(sqldf)
```

```
## Loading required package: gsubfn
```

```
## Loading required package: proto
```

```
## Warning in doTryCatch(return(expr), name, parentenv, handler): unable to load s  
hared object '/Library/Frameworks/R.framework/Resources/modules//R_X11.so':  
##   dlopen(/Library/Frameworks/R.framework/Resources/modules//R_X11.so, 6): Libra  
ry not loaded: /opt/X11/lib/libSM.6.dylib  
##   Referenced from: /Library/Frameworks/R.framework/Resources/modules//R_X11.so  
##   Reason: image not found
```

```
## Could not load tcltk. Will use slower R code instead.
```

```
## Loading required package: RSQLite
```

```
library(car)
```

```
## Warning: package 'car' was built under R version 3.4.3
```

```
library(caTools)  
library(caret)
```

```
## Loading required package: lattice
```

```
## Loading required package: ggplot2
```

```
#install.packages("RANN")
library('RANN')
#install.packages("mice")
library(mice)

## Warning: package 'mice' was built under R version 3.4.2

library(DMwR)

## Loading required package: grid

## 
## Attaching package: 'DMwR'

## The following object is masked from 'package:fma':
## 
##     sales
```

Importing the dataset

```
setwd("~/Desktop/U Conn/Lectures/Data Mining/Project/")
features<-read.csv('features.csv')
stores<-read.csv('stores.csv')
train<-read.csv('train.csv')
count<-0
```

Checking the dataset

```
head(train)
```

```
##   Store Dept      Date Weekly_Sales IsHoliday
## 1     1     1 2010-02-05     24924.50    FALSE
## 2     1     1 2010-02-12     46039.49    TRUE
## 3     1     1 2010-02-19     41595.55   FALSE
## 4     1     1 2010-02-26     19403.54   FALSE
## 5     1     1 2010-03-05     21827.90   FALSE
## 6     1     1 2010-03-12     21043.39   FALSE
```

```
head(stores)
```

```
##   Store Type  Size
## 1     1    A 151315
## 2     2    A 202307
## 3     3    B 37392
## 4     4    A 205863
## 5     5    B 34875
## 6     6    A 202505
```

```
head(features)
```

```
##   Store      Date Temperature Fuel_Price MarkDown1 MarkDown2 MarkDown3
## 1     1 2010-02-05       42.31     2.572      NA      NA      NA
## 2     1 2010-02-12       38.51     2.548      NA      NA      NA
## 3     1 2010-02-19       39.93     2.514      NA      NA      NA
## 4     1 2010-02-26       46.63     2.561      NA      NA      NA
## 5     1 2010-03-05       46.50     2.625      NA      NA      NA
## 6     1 2010-03-12       57.79     2.667      NA      NA      NA
##   MarkDown4 MarkDown5      CPI Unemployment IsHoliday
## 1       NA       NA 211.0964      8.106 FALSE
## 2       NA       NA 211.2422      8.106 TRUE
## 3       NA       NA 211.2891      8.106 FALSE
## 4       NA       NA 211.3196      8.106 FALSE
## 5       NA       NA 211.3501      8.106 FALSE
## 6       NA       NA 211.3806      8.106 FALSE
```

Merging the dataset

```
df<-merge(train,stores,all.x = T)
head(df)
```

```
##   Store Dept      Date Weekly_Sales IsHoliday Type  Size
## 1     1    1 2010-02-05     24924.50 FALSE    A 151315
## 2     1    1 2010-02-12     46039.49  TRUE    A 151315
## 3     1    1 2010-02-19     41595.55 FALSE    A 151315
## 4     1    1 2010-02-26     19403.54 FALSE    A 151315
## 5     1    1 2010-03-05     21827.90 FALSE    A 151315
## 6     1    1 2010-03-12     21043.39 FALSE    A 151315
```

```
df1<-merge(df,features,all.x = T)
head(df1)
```

```

##   Store      Date IsHoliday Dept Weekly_Sales Type    Size Temperature
## 1     1 2010-02-05 FALSE      1    24924.50 A 151315 42.31
## 2     1 2010-02-05 FALSE     26    11737.12 A 151315 42.31
## 3     1 2010-02-05 FALSE     17   13223.76 A 151315 42.31
## 4     1 2010-02-05 FALSE     45     37.44 A 151315 42.31
## 5     1 2010-02-05 FALSE     28   1085.29 A 151315 42.31
## 6     1 2010-02-05 FALSE     79   46729.77 A 151315 42.31
##   Fuel_Price MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5       CPI
## 1     2.572        NA        NA        NA        NA        NA 211.0964
## 2     2.572        NA        NA        NA        NA        NA 211.0964
## 3     2.572        NA        NA        NA        NA        NA 211.0964
## 4     2.572        NA        NA        NA        NA        NA 211.0964
## 5     2.572        NA        NA        NA        NA        NA 211.0964
## 6     2.572        NA        NA        NA        NA        NA 211.0964
##   Unemployment
## 1     8.106
## 2     8.106
## 3     8.106
## 4     8.106
## 5     8.106
## 6     8.106

```

Defining the stores and departments (Selecting top 5 stores and department)

```

st<-c(2,4,13,14,20)
dt<-c(92,95,38,72,90)
tot<-length(st)*length(dt)

```

Running the model (ARIMA ETS), Appending the output in csv files

```

setwd("~/Desktop/U Conn/Lectures/Data Mining/Project/")
for(i in st){
  for(j in dt){

S1D1<-subset(df1,Store==i & Dept==j)

str(S1D1,trace=FALSE)

S1D1$Date<-as.character(S1D1$Date)
S1D1$Store<- as.factor(S1D1$Store)
S1D1$Dept<- as.factor(S1D1$Dept)

```

```

S1D1$Type<- as.factor(S1D1$Type)

S1D1$Size<- as.numeric(S1D1$Size)
S1D1$MarkDown1<- as.numeric(S1D1$MarkDown1)
S1D1$MarkDown2<- as.numeric(S1D1$MarkDown2)
S1D1$MarkDown3<- as.numeric(S1D1$MarkDown3)
S1D1$MarkDown4<- as.numeric(S1D1$MarkDown4)
S1D1$MarkDown5<- as.numeric(S1D1$MarkDown5)
sum(is.na(S1D1))

imputed_data = mice(data = S1D1, m = 5, method = "rf", maxit = 10, seed = 500, trace=FALSE)
S1D1 = complete(imputed_data,3)

S1D1>Date <- as.Date(S1D1>Date,format= "%Y-%m-%d")

S1D1_100 <- subset(S1D1,S1D1>Date > as.Date("2010-02-04",format= "%Y-%m-%d")
                     & S1D1>Date < as.Date("2012-01-01",format=
"%Y-%m-%d"))

S1D1_t <- subset(S1D1,S1D1>Date > as.Date("2012-01-01",format= "%Y-%m-%d"))

xregMatrix <- data.frame(as.factor(S1D1_100$IsHoliday),
                         S1D1_100$Temperature,
                         as.numeric(S1D1_100$MarkDown1),as.numeric(S1D1_100$Mark
Down2),
                         as.numeric(S1D1_100$MarkDown3),as.numeric(S1D1_100$Mark
Down4),
                         as.numeric(S1D1_100$Fuel_Price),as.numeric(S1D1_100$Un
employment),
                         as.numeric(S1D1_100$CPI))

xregMatrix1 <- data.frame(as.factor(S1D1_100$IsHoliday),
                           S1D1_100$Temperature,
                           as.numeric(S1D1_100$MarkDown1),as.numeric(S1D1_100$Mark
Down2),
                           as.numeric(S1D1_100$MarkDown3),as.numeric(S1D1_100$Mark
Down4),
                           as.numeric(S1D1_100$Unemployment))

train_matrix <- NULL
train_matrix <- data.matrix(xregMatrix)
train_matrix1 <- NULL
train_matrix1 <- data.matrix(xregMatrix1)

print(paste("Showing the results of store = ",i," department = ",j))

tsDataSales<-ts(S1D1$Weekly_Sales,start=c(2010,5),frequency=52)

```

```
plot(tsDataSales)

plot(decompose(tsDataSales))
train_sales<-window(tsDataSales,start=c(2010,5),end=c(2011,52),frequency = 52)
test_sales<-window(tsDataSales,start=2012,frequency = 52)
ndiffs(train_sales)
Acf(train_sales,lag.max=52,plot=TRUE)
Pacf(train_sales,lag.max=52,plot=TRUE,main="Original Time Series")

print("Running the Arima Model with all regressors")
tst_arima <- auto.arima(train_sales,seasonal = FALSE,xreg = train_matrix)
print("Running the Arima Model excluding CPI and Fuel Price regressors")
tst_arimal <- auto.arima(train_sales,seasonal = FALSE,xreg = train_matrix1)
#summary(tst_arima)
print("Running the ETS (Error, Trend, Seasonality) model")
ch<-ets(train_sales)

accuracy(ch)
tst_arima_resi <- residuals(tst_arima)
summary(tst_arima_resi)

plot(tst_arima_resi)
qqnorm(tst_arima_resi)
qqline(tst_arima_resi)

box<-Box.test(tst_arima_resi,lag=52,type="Ljung-Box",fitdf=1)
box

forecastval <- forecast(tst_arima,h=52,xreg =train_matrix)
forecastval1 <- forecast(tst_arimal,h=52,xreg =train_matrix1)

final<-cbind(store=i,department=j,date=as.character(S1D1_100$Date),train=train_sales,forecast=forecastval$fitted)
final_test<-cbind(store=i,department=j,date=as.character(S1D1_t$Date),
                  test=S1D1_t$Weekly_Sales,forecast=forecastval$mean[1:length(test_sales)])]

final1<-cbind(store=i,department=j,date=as.character(S1D1_100$Date),
               train=train_sales,forecast=forecastval1$fitted)
final_test1<-cbind(store=i,department=j,date=as.character(S1D1_t$Date),
                   test=S1D1_t$Weekly_Sales,forecast=forecastval1$mean[1:length(test_sales)])
```

```

# Writing the output and appending them to the file
write.table(final,"final.csv",sep = ",",append = TRUE,col.names = FALSE,row.names = FALSE)
write.table(final_test,"final_test.csv",sep = ",",append = TRUE,col.names = FALSE,row.names = FALSE)
write.table(cbind(store=i,department=j,as.data.frame(accuracy(tst_arima))),"accuracy.csv",sep=',',append=TRUE,
           col.names = FALSE,row.names = FALSE)

write.table(final,"final1.csv",sep = ",",append = TRUE,col.names = FALSE,row.names = FALSE)

write.table(final_test,"final_test1.csv",sep = ",",append = TRUE,col.names = FALSE,row.names = FALSE)

write.table(cbind(store=i,department=j,as.data.frame(accuracy(tst_arimal))),"accuracy1.csv",sep=',',append=TRUE,col.names = FALSE,row.names = FALSE)

write.table(cbind(store=i,department=j,as.data.frame(accuracy(ch))),"accuracy_ets.csv",sep=',',append=TRUE,col.names = FALSE,row.names = FALSE)

plot(forecastval,main="Prediction from Auto Arima for Weekly Sales")
lines(test_sales,col="green")

count<-count+1

print(paste(count," out of ",tot," Completed"))
print(paste(round(count/tot,2)*100,"% Completed"))

}
}

```

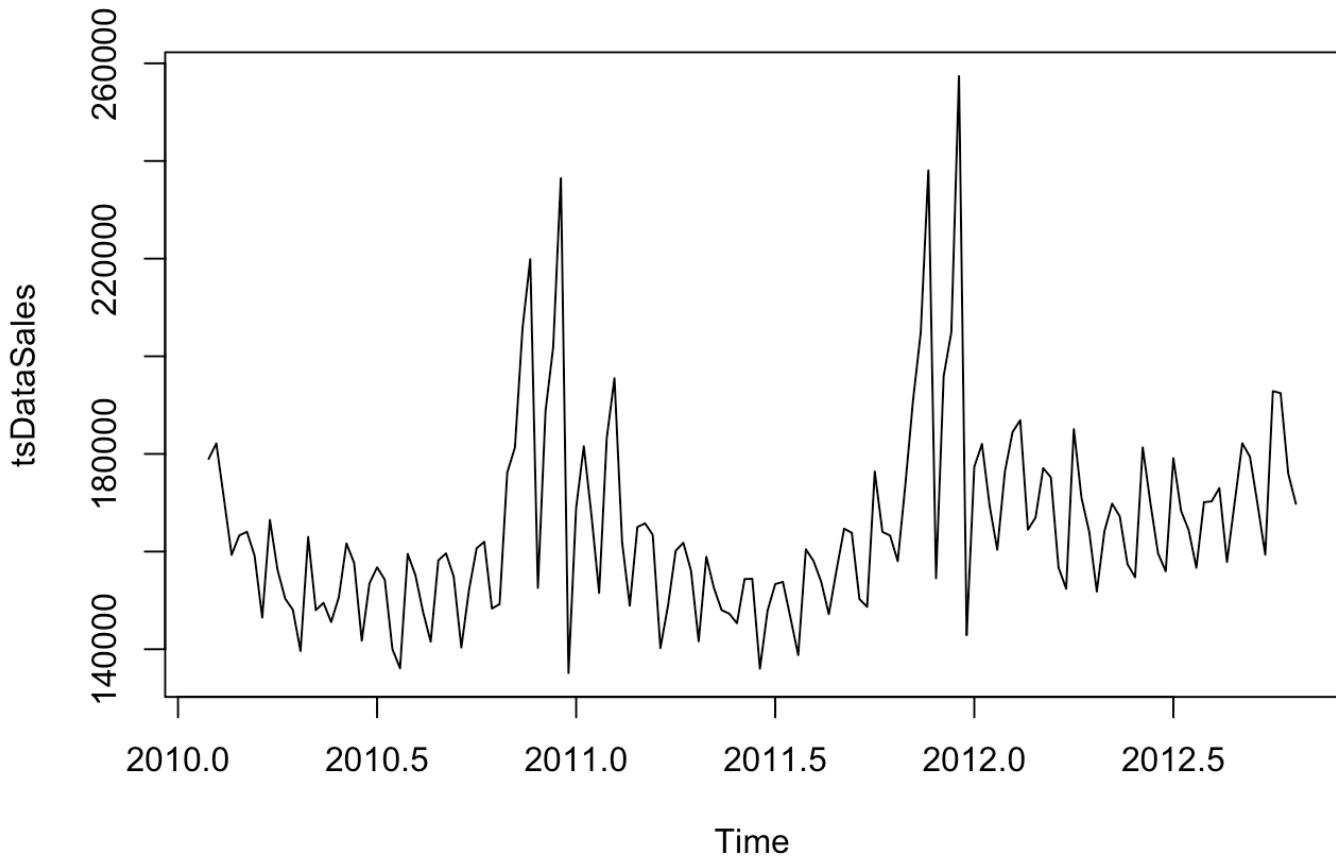
```

## 'data.frame':    143 obs. of  16 variables:
## $ Store      : int  2 2 2 2 2 2 2 2 2 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi  FALSE TRUE FALSE FALSE FALSE ...
## $ Dept        : int  92 92 92 92 92 92 92 92 92 ...
## $ Weekly_Sales: num  178983 182143 170826 159343 163301 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int  202307 202307 202307 202307 202307 202307 202307 202307 202307 ...
## $ Temperature : num  40.2 38.5 39.7 46.1 47.2 ...
## $ Fuel_Price  : num  2.57 2.55 2.51 2.56 2.62 ...
## $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...

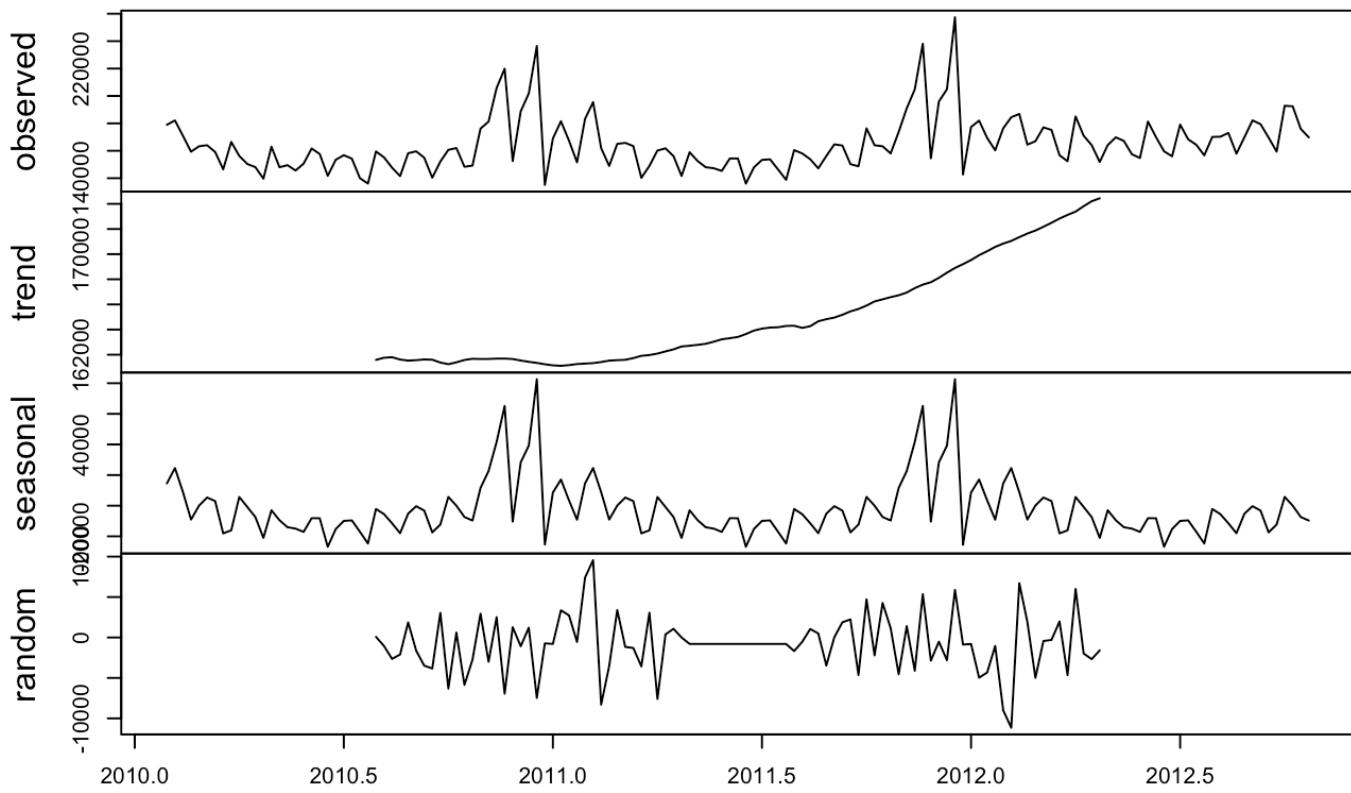
```

```
## $ Markdown5 : num NA ...  
## $ CPI : num 211 211 211 211 211 ...  
## $ Unemployment: num 8.32 8.32 8.32 8.32 8.32 ...  
##  
## iter imp variable  
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5  
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

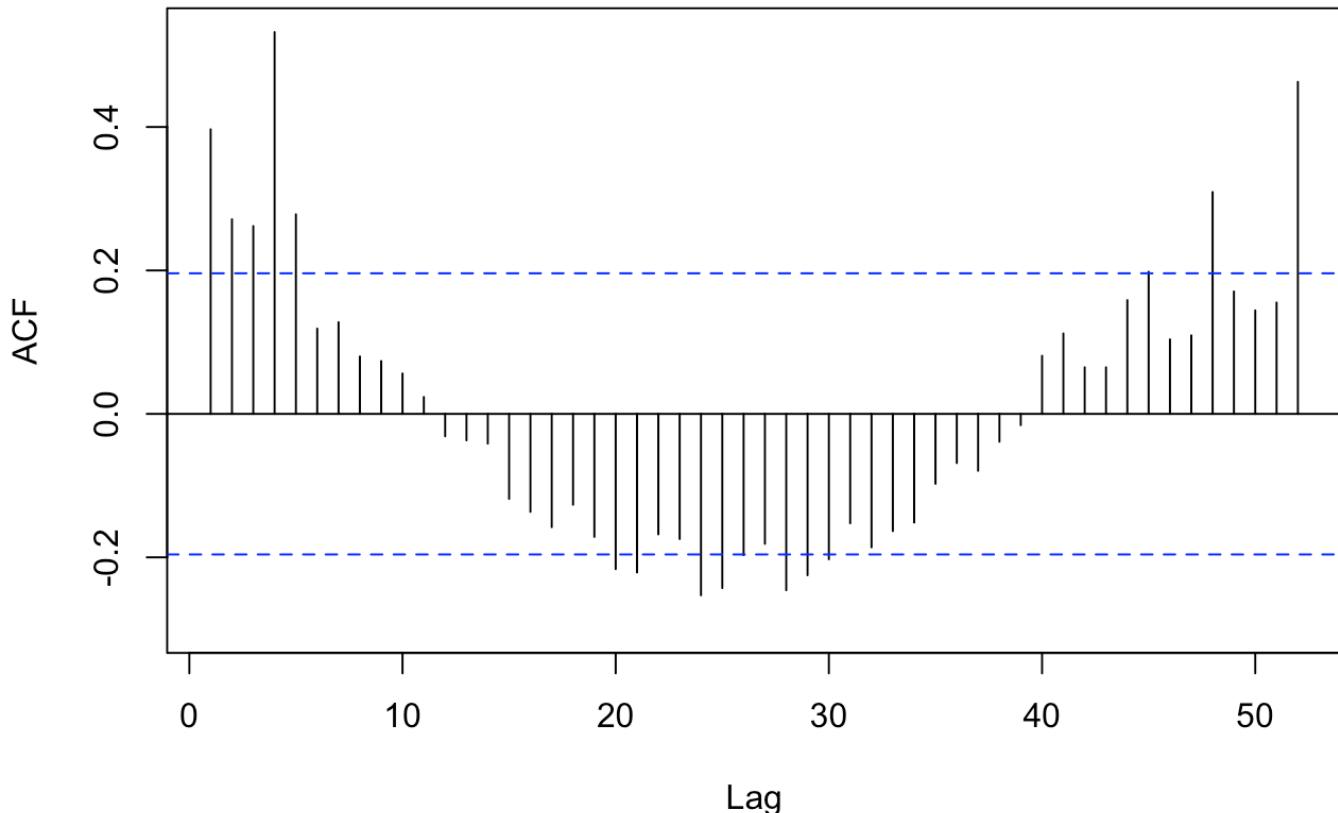
```
## 10 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## [1] "Showing the results of store = 2 department = 92"
```



Decomposition of additive time series



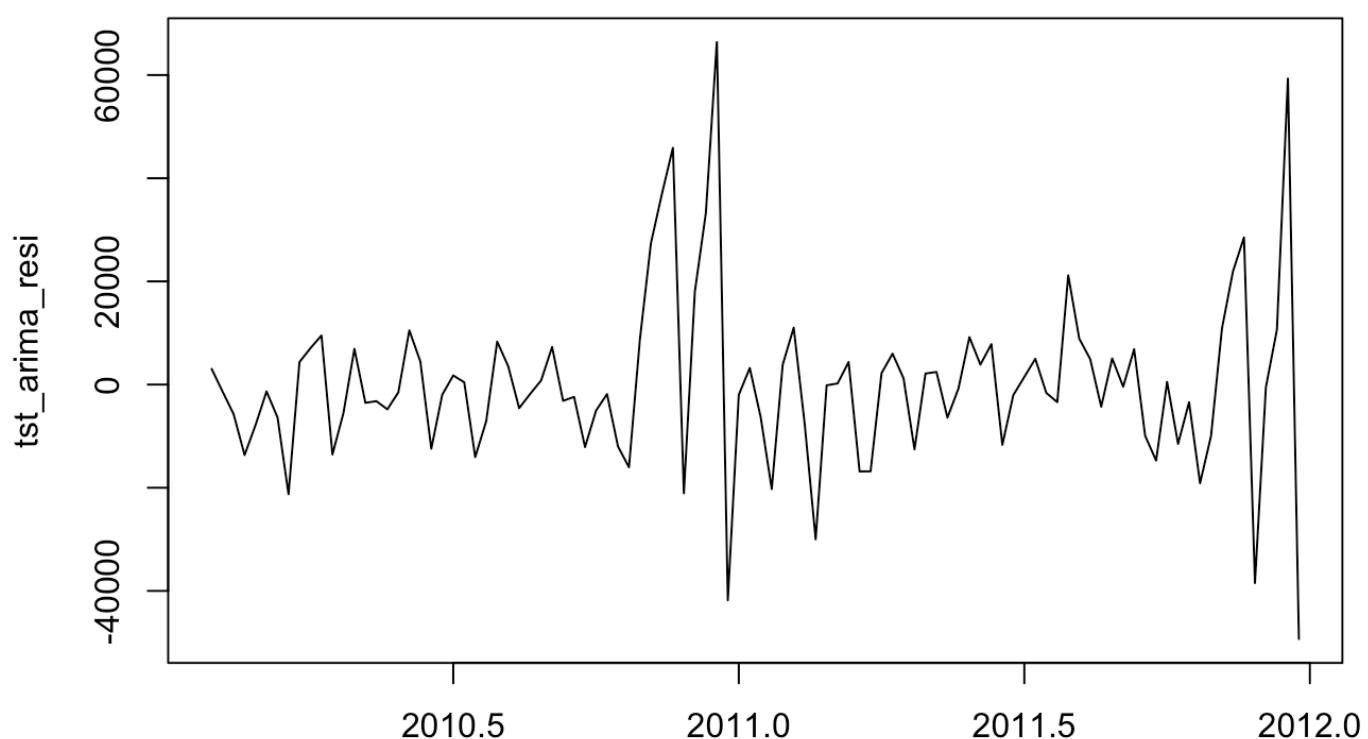
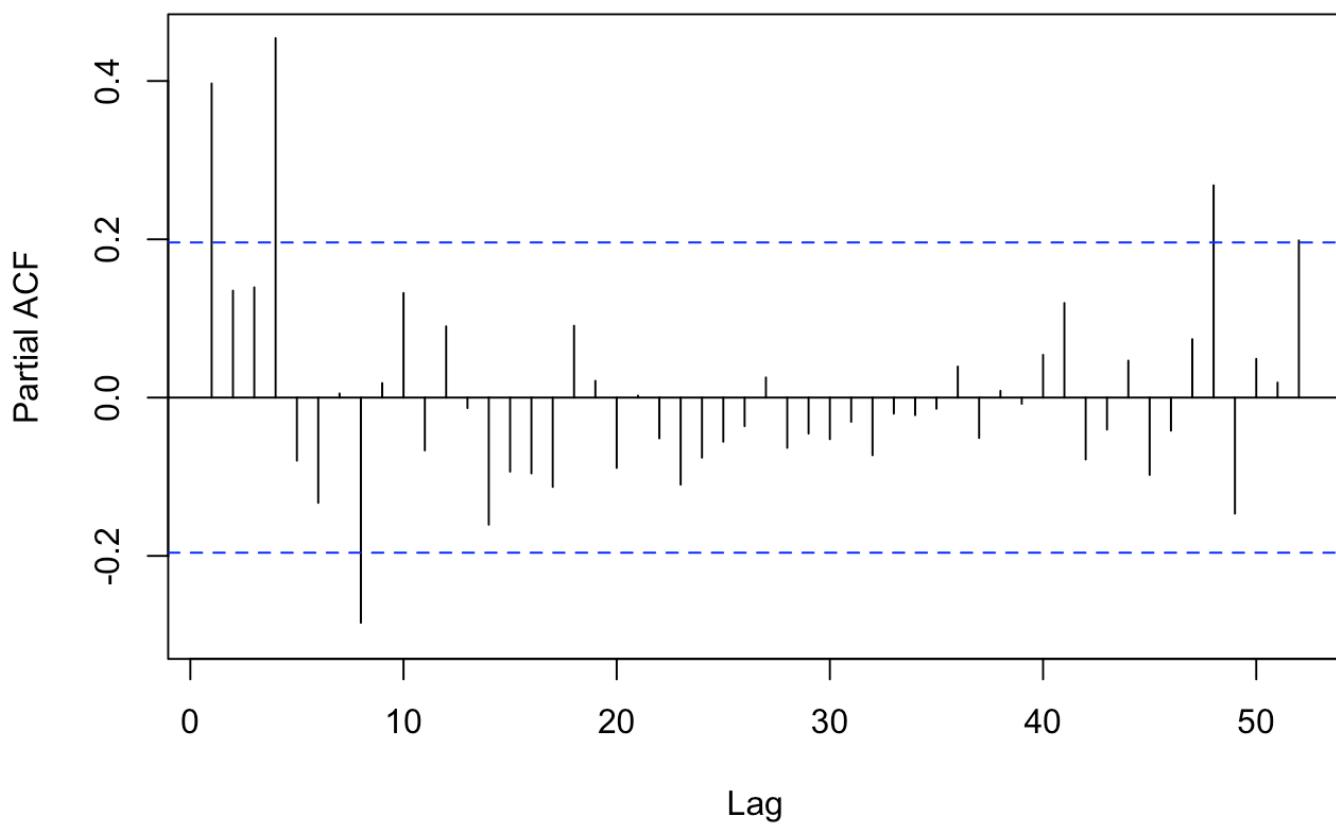
Time

Series train_sales

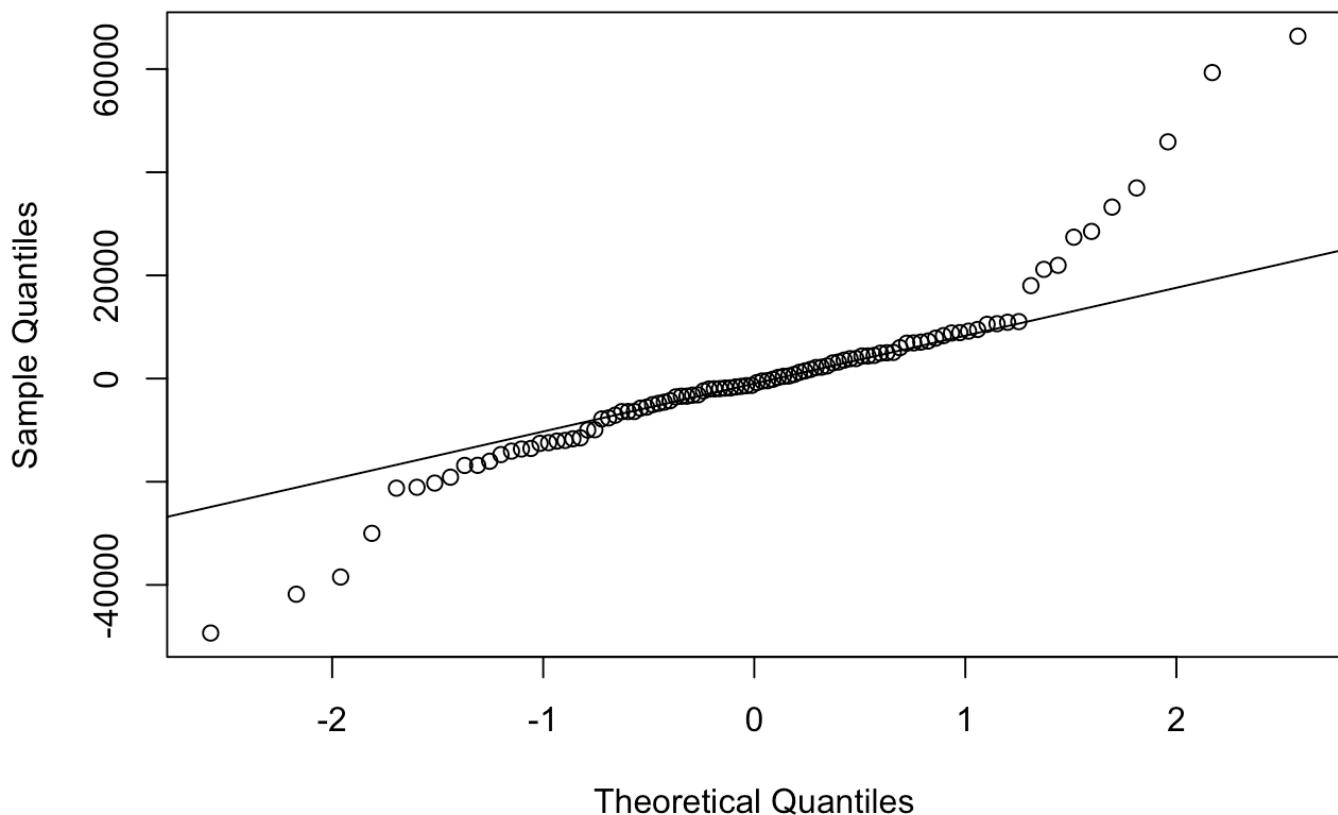
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

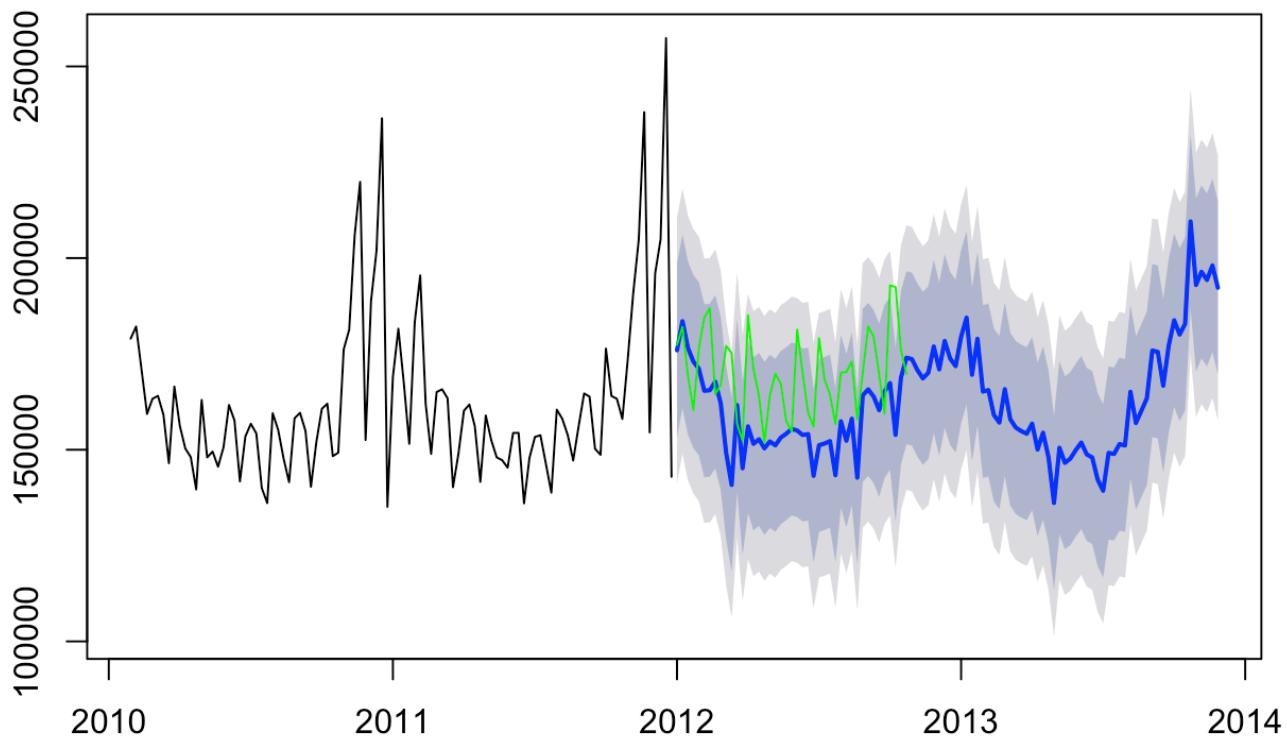

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



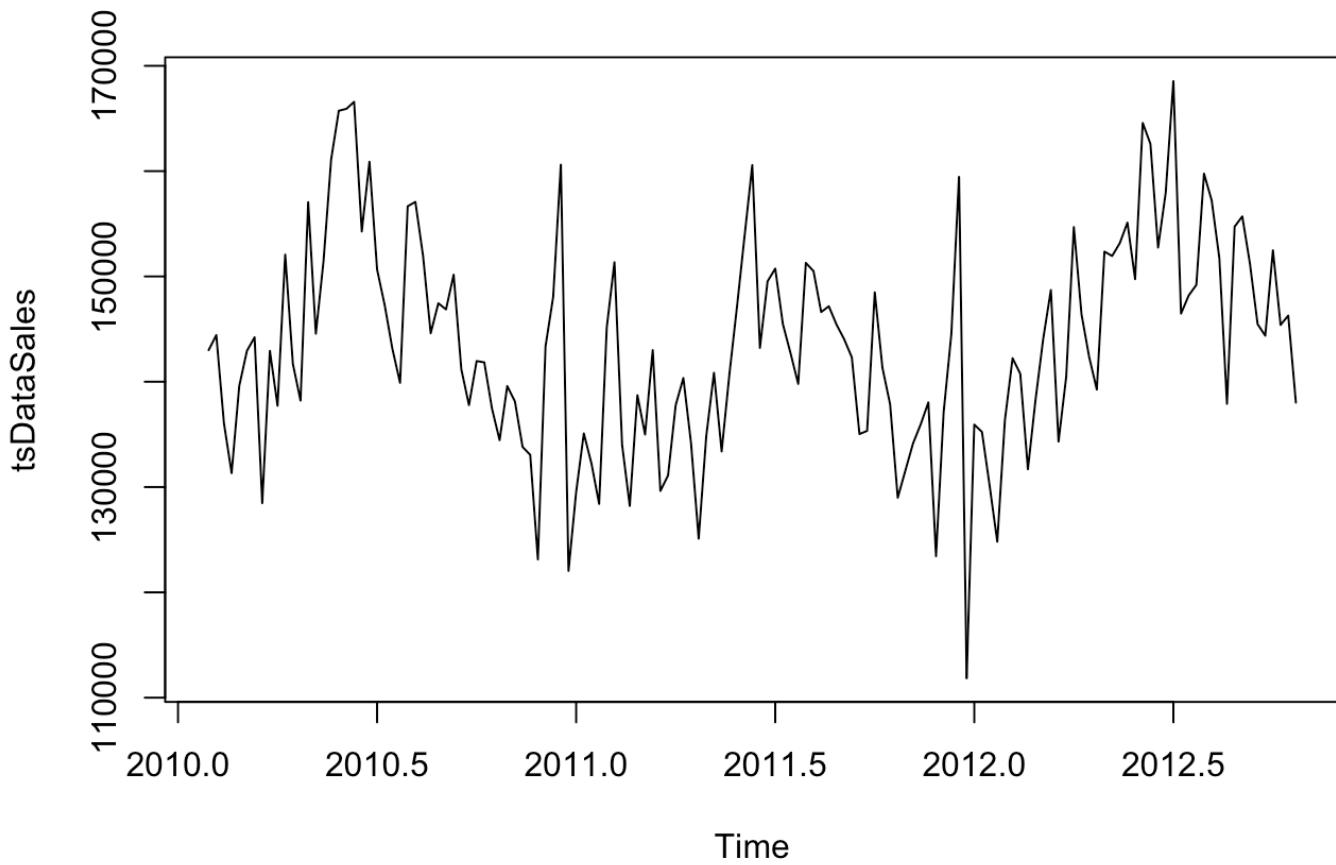
```

## [1] "1  out of  25  Completed"
## [1] "4 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  2 2 2 2 2 2 2 2 2 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
##   $ 7          : 
##   $ 8          : 
##   $ 9          : 
##   $ 10         : 
##   $ IsHoliday  : logi  FALSE TRUE FALSE FALSE FALSE FALSE ...
##   $ Dept       : int  95 95 95 95 95 95 95 95 95 ...
##   $ Weekly_Sales: num  143003 144429 136045 131327 139610 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  202307 202307 202307 202307 202307 202307 202307 202307 202307 ...
##   $ 02307     : 
##   $ 202307    : 
##   $ Temperature: num  40.2 38.5 39.7 46.1 47.2 ...
##   $ Fuel_Price : num  2.57 2.55 2.51 2.56 2.62 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  211 211 211 211 211 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
## 
## 
##   iter imp variable

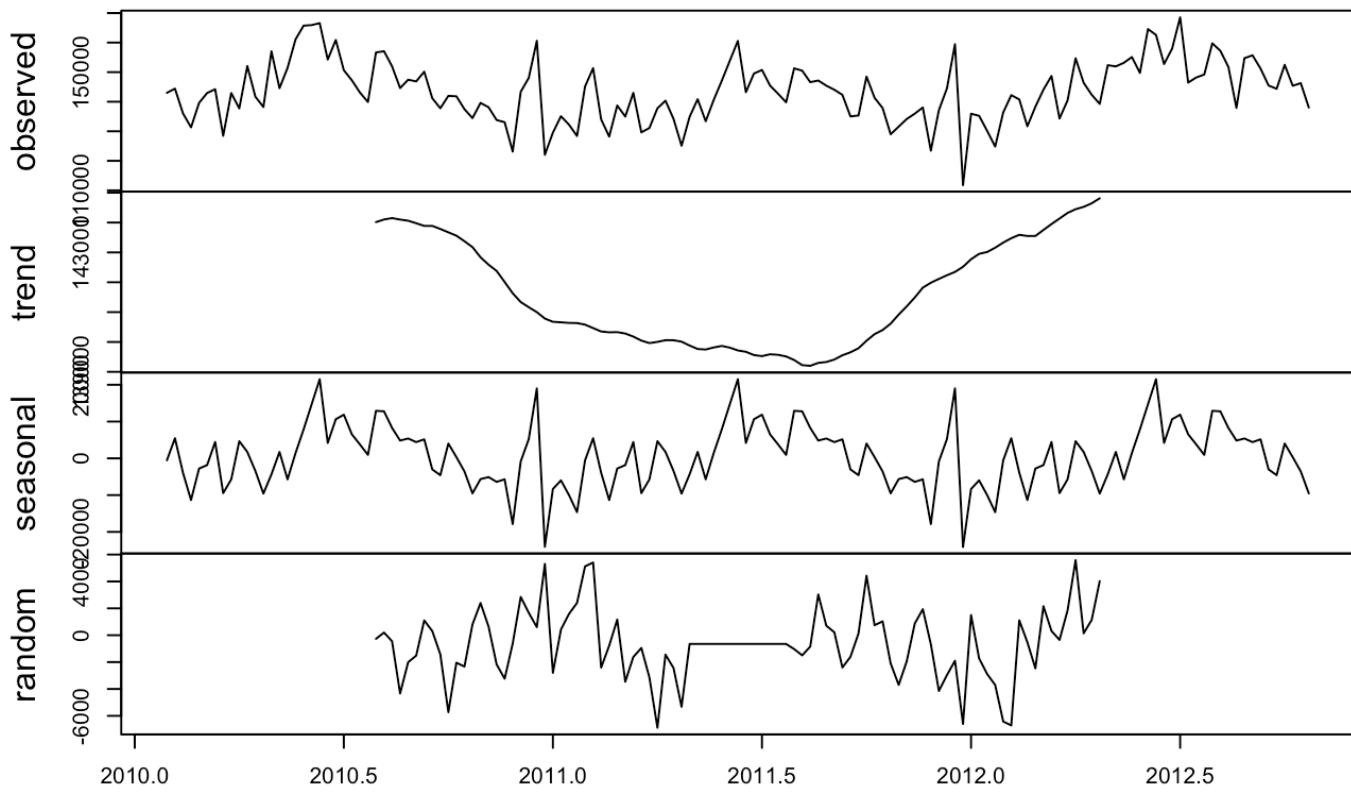
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

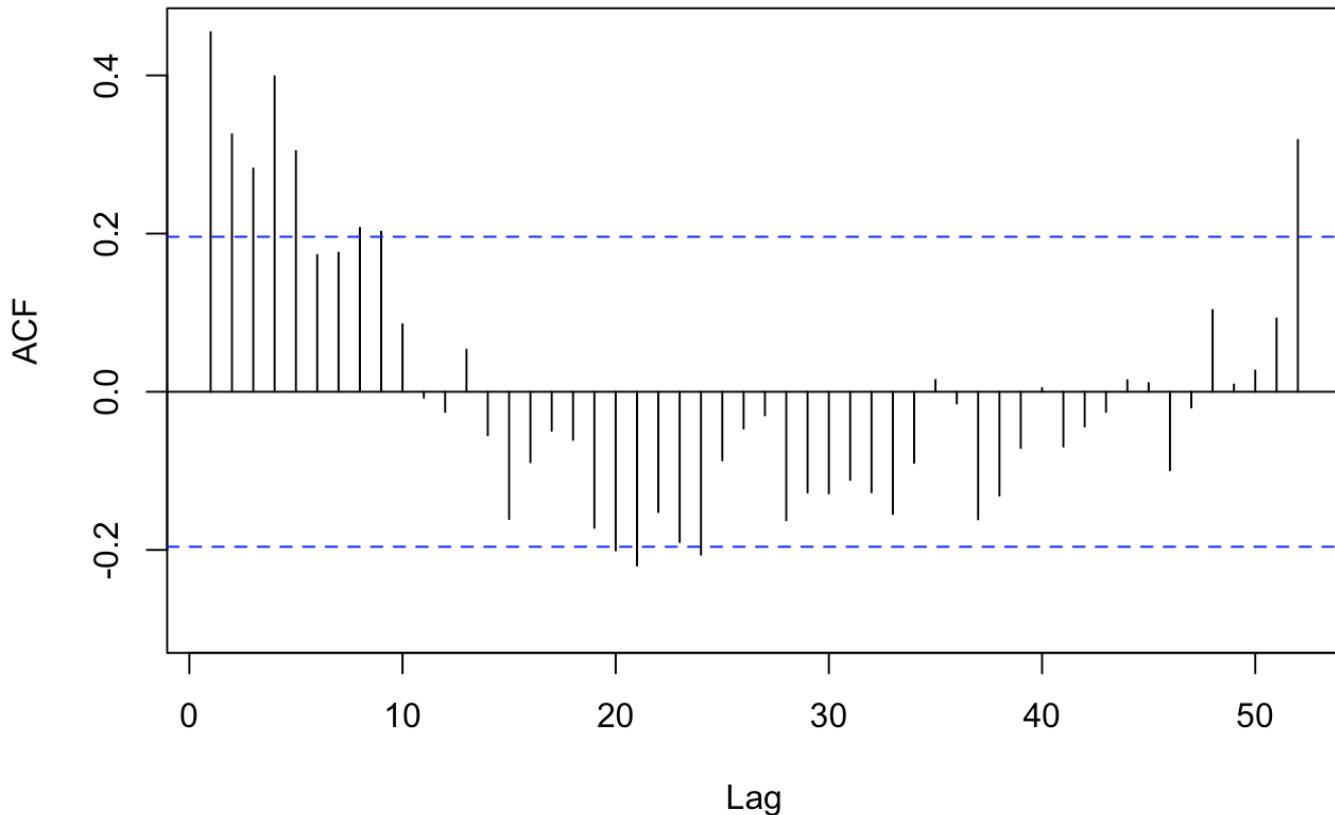
```
## [1] "Showing the results of store = 2 department = 95"
```



Decomposition of additive time series



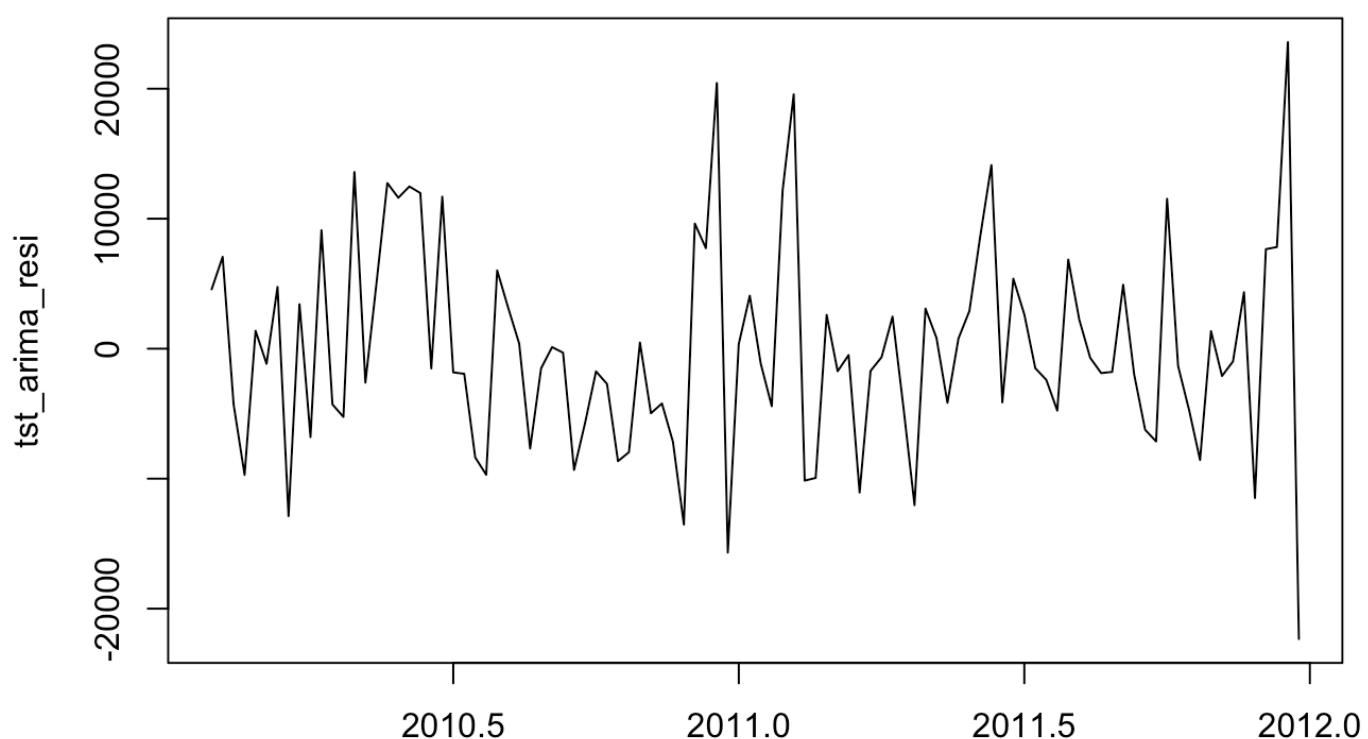
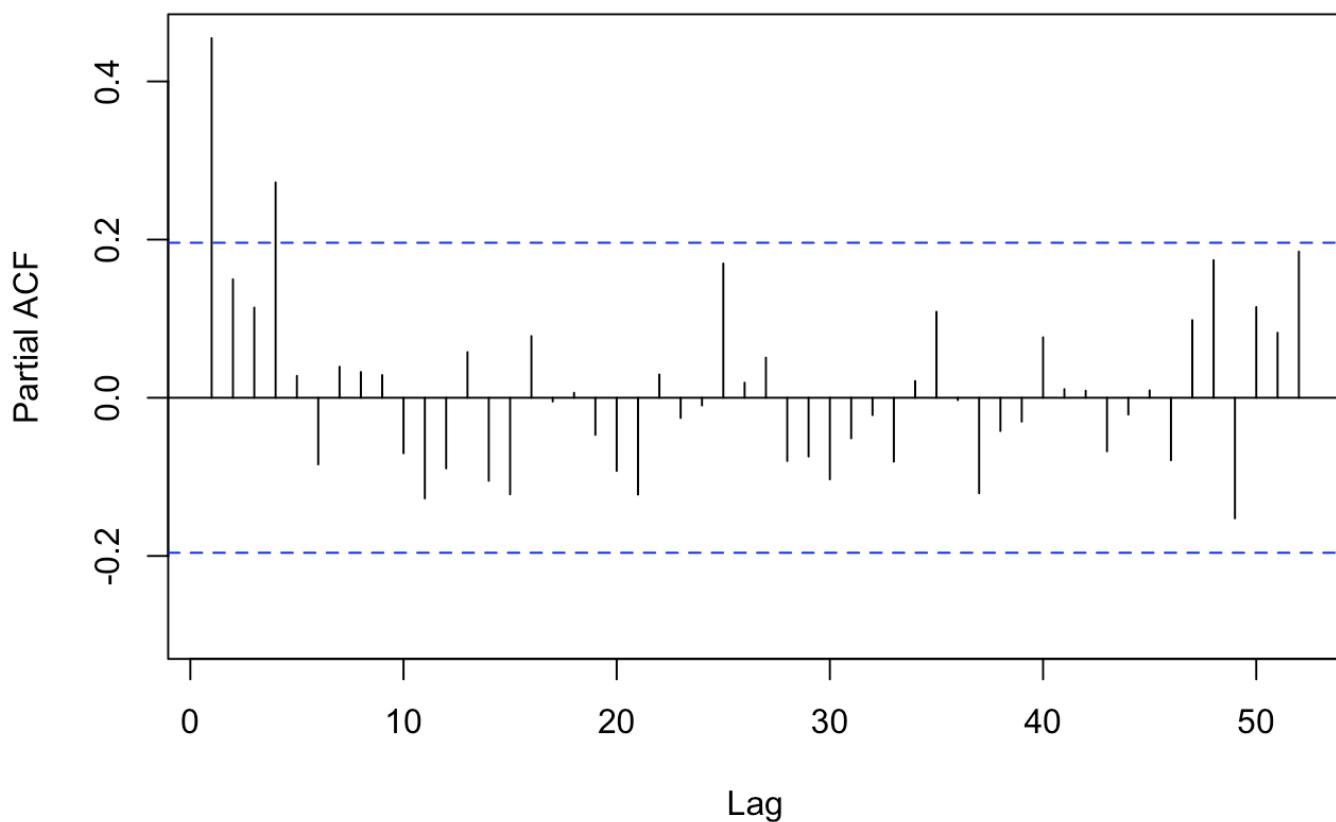
Time

Series train_sales

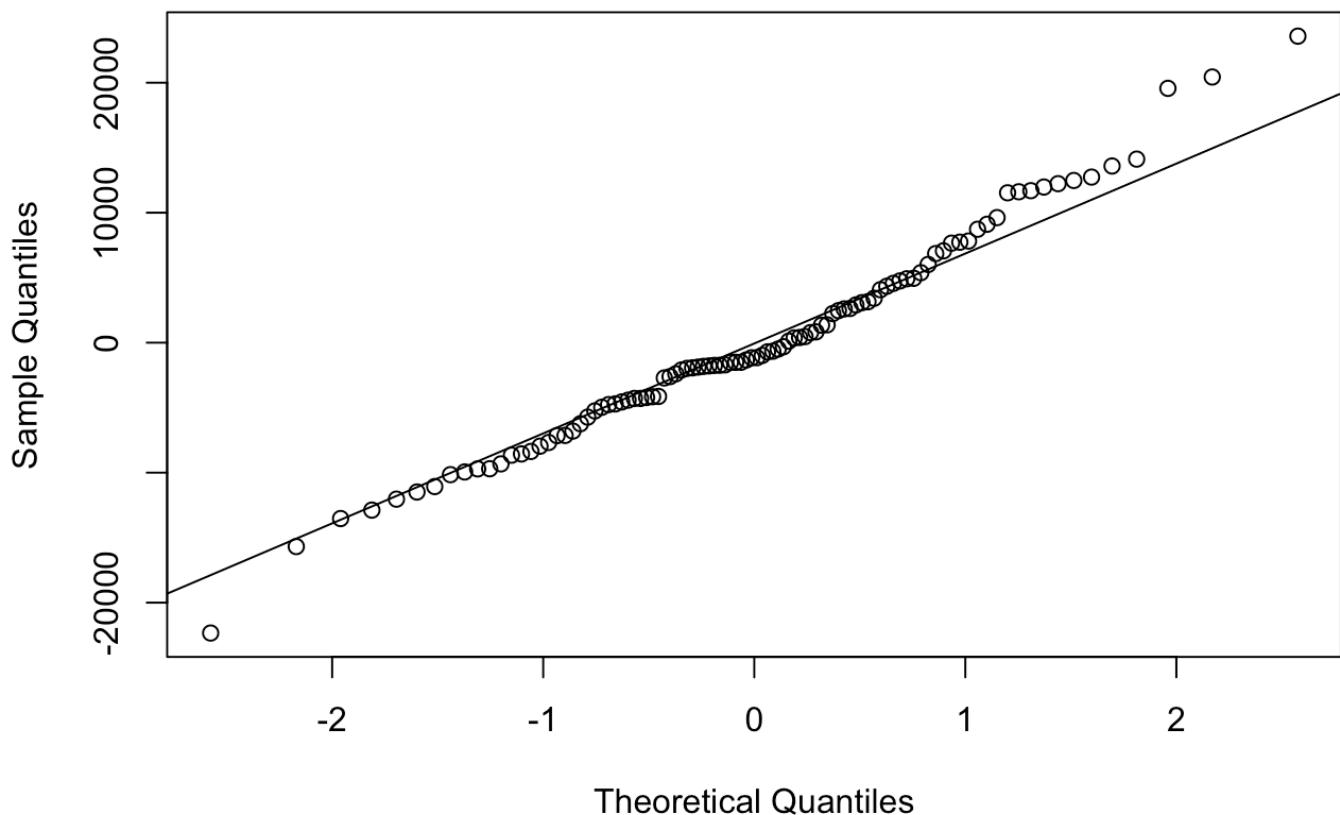
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

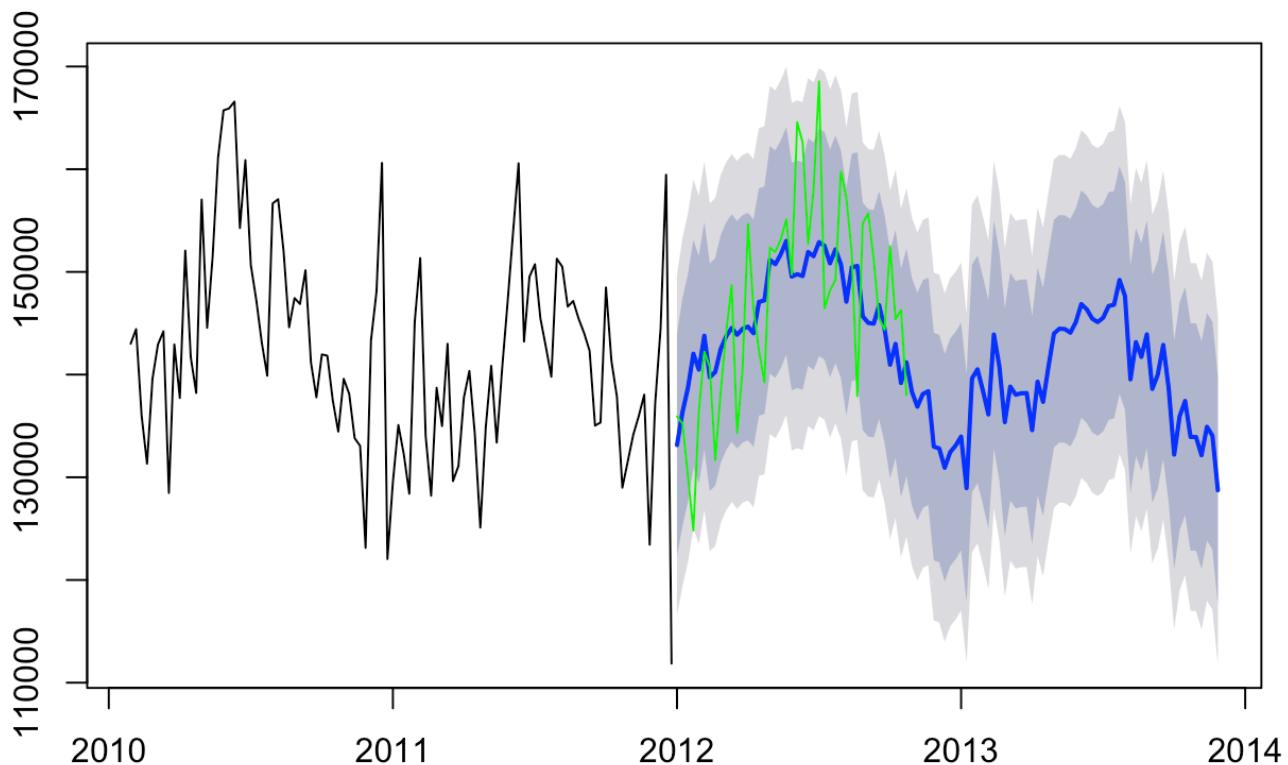

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



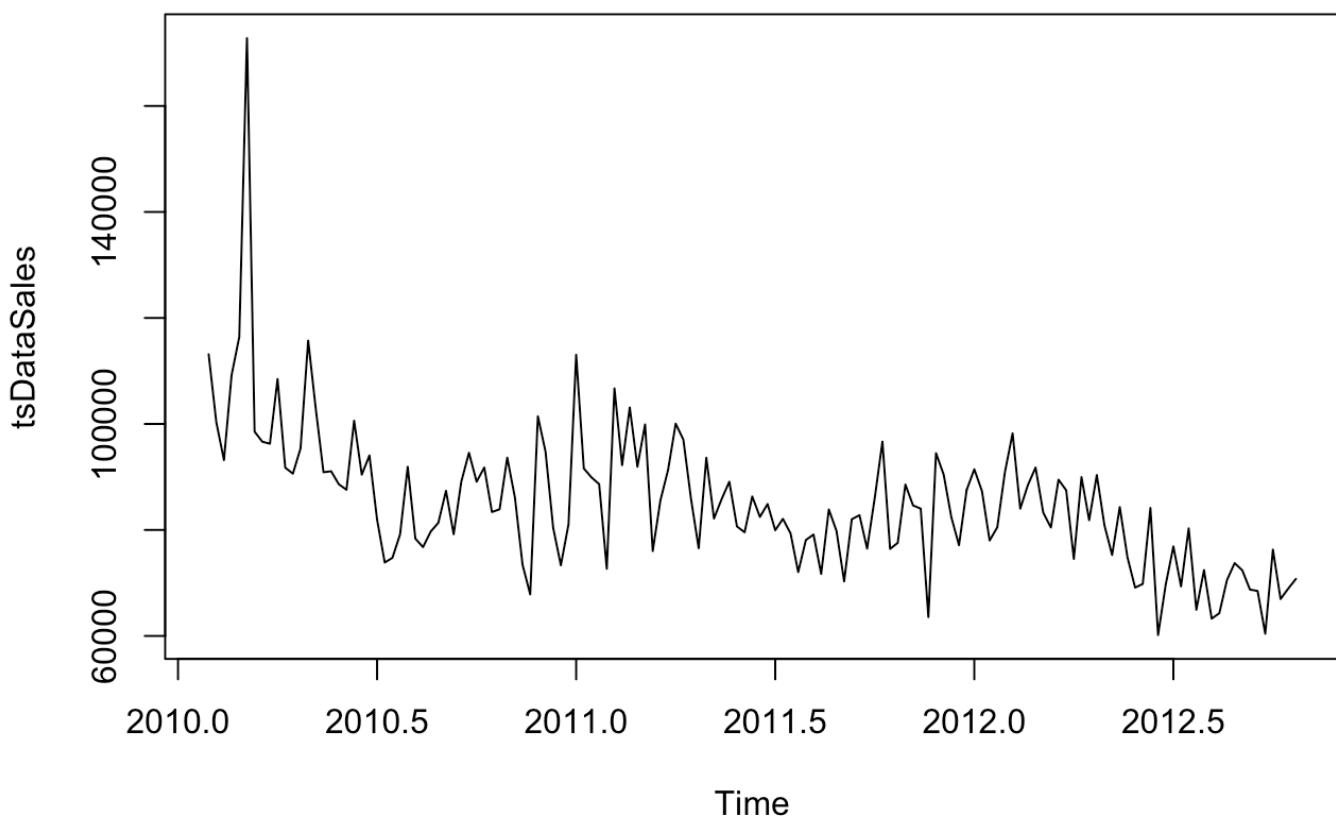
```

## [1] "2  out of  25  Completed"
## [1] "8 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  2 2 2 2 2 2 2 2 2 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
##   $ 8 9 10 ...
##   $ IsHoliday   : logi  FALSE TRUE FALSE FALSE FALSE FALSE ...
##   $ Dept        : int  38 38 38 38 38 38 38 38 38 ...
##   $ Weekly_Sales: num  113145 100344 93181 109234 116410 ...
##   $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size        : int  202307 202307 202307 202307 202307 202307 202307 202307 202307 ...
##   $ 02307 202307 ...
##   $ Temperature : num  40.2 38.5 39.7 46.1 47.2 ...
##   $ Fuel_Price   : num  2.57 2.55 2.51 2.56 2.62 ...
##   $ MarkDown1    : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2    : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3    : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4    : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5    : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI          : num  211 211 211 211 211 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
## 
## 
##   iter imp variable

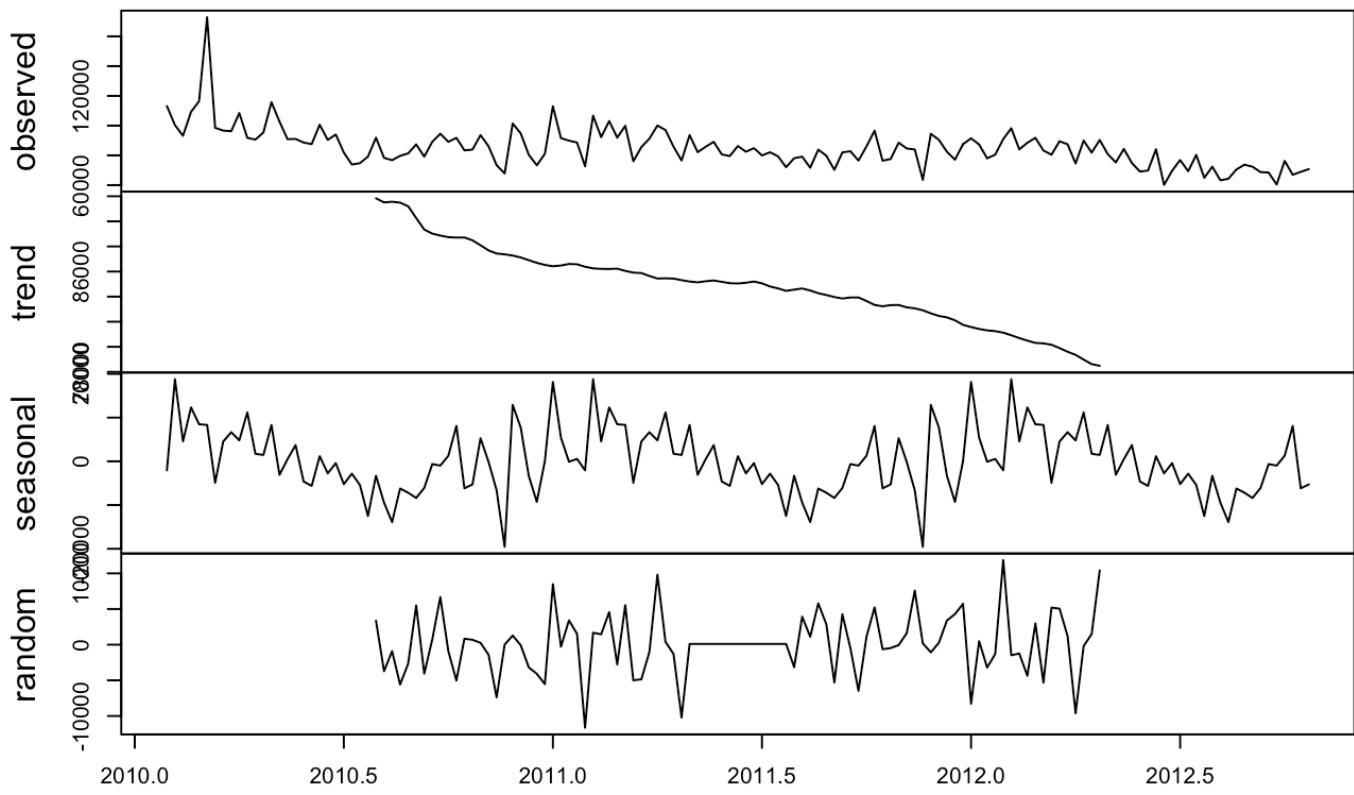
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

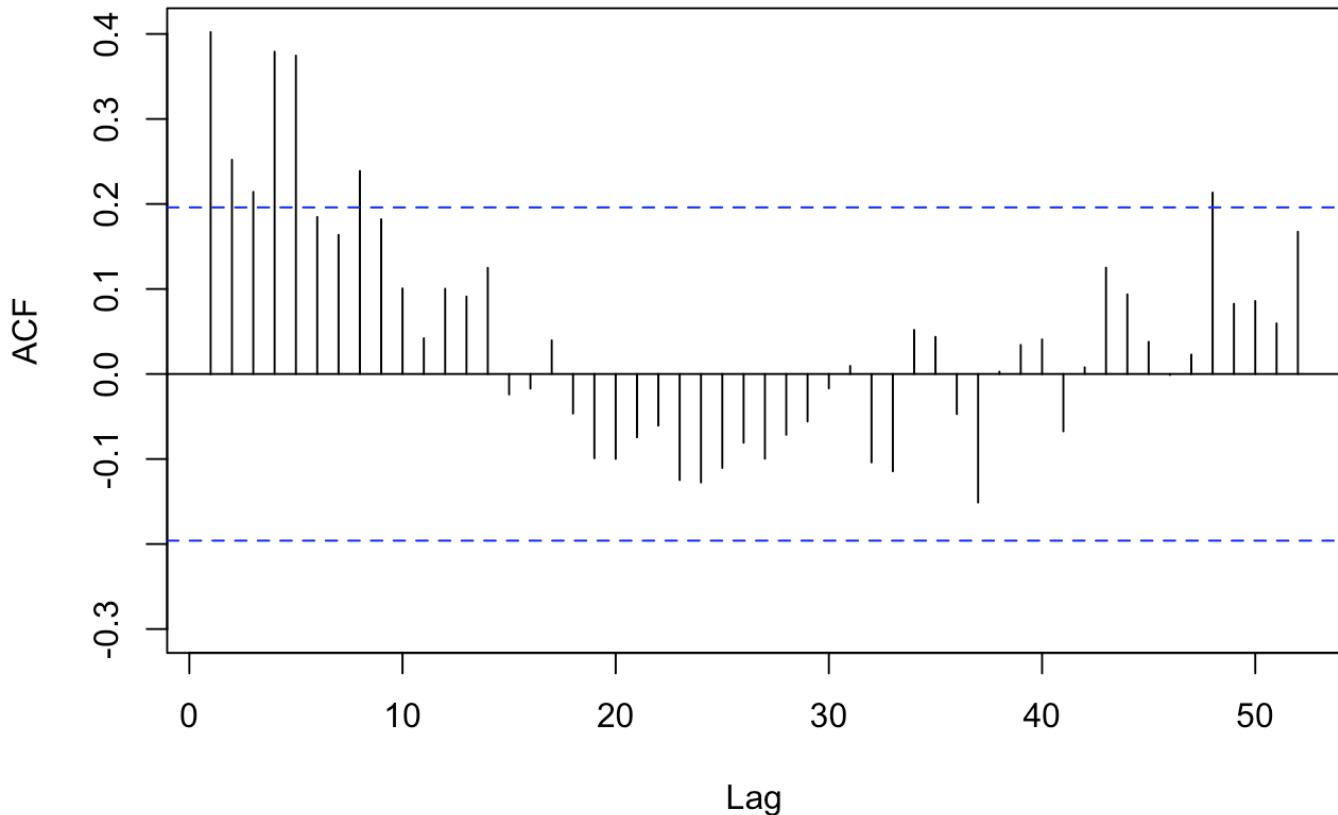
```
## [1] "Showing the results of store = 2 department = 38"
```



Decomposition of additive time series



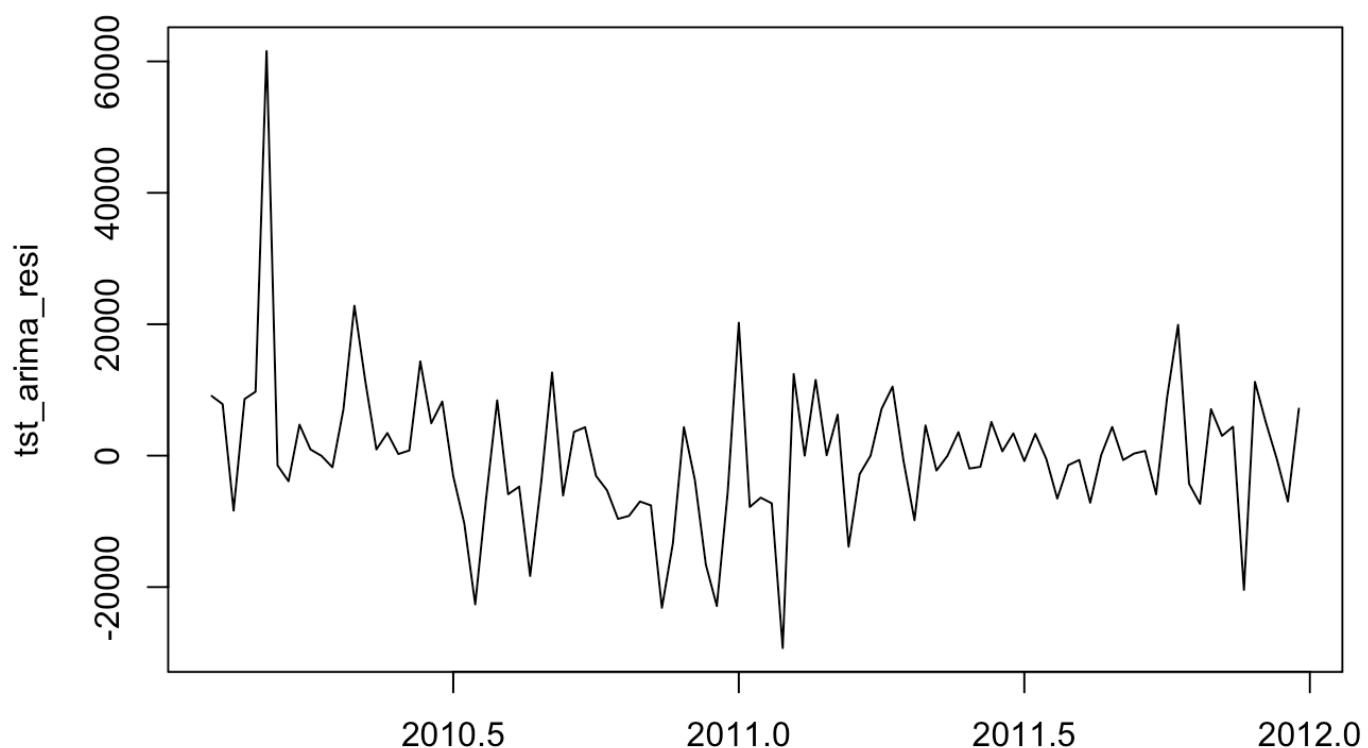
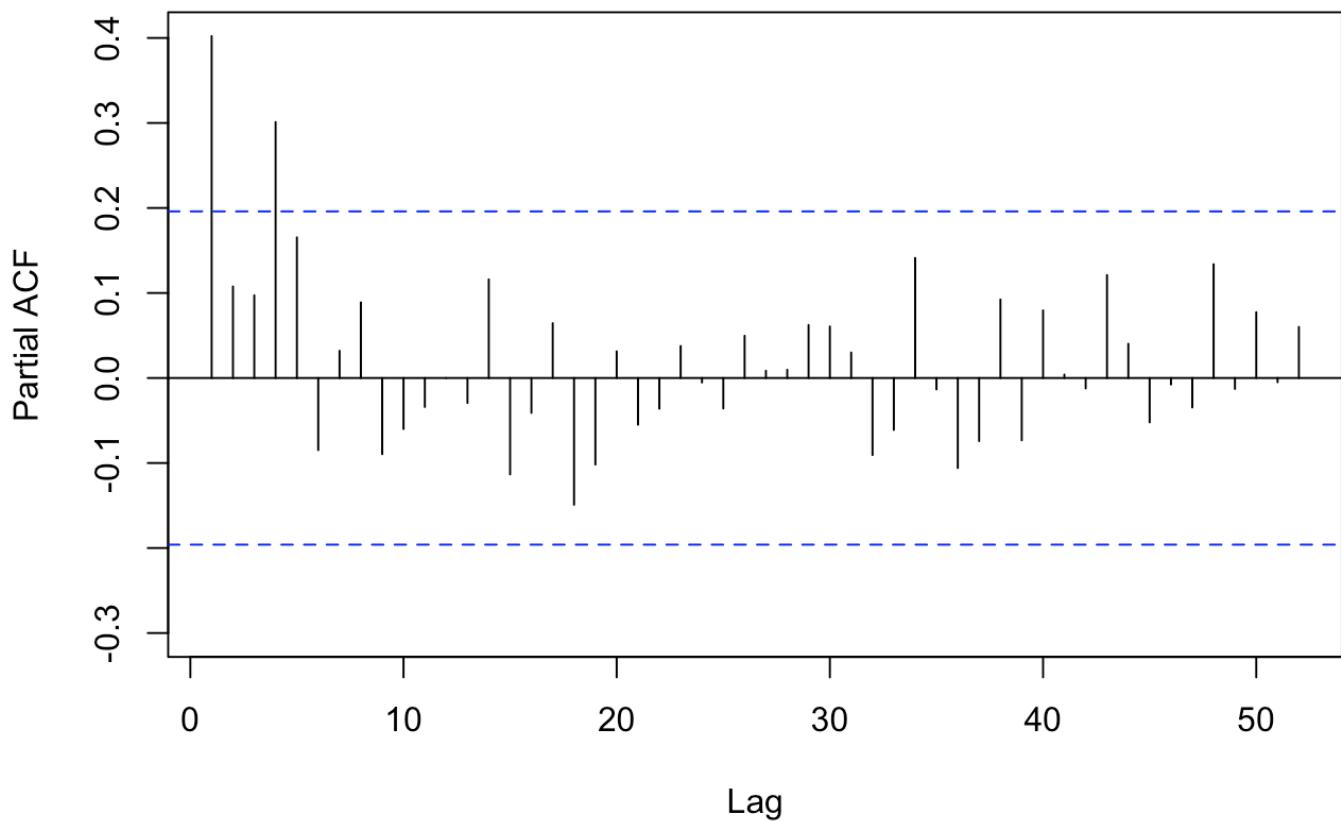
Time

Series train_sales

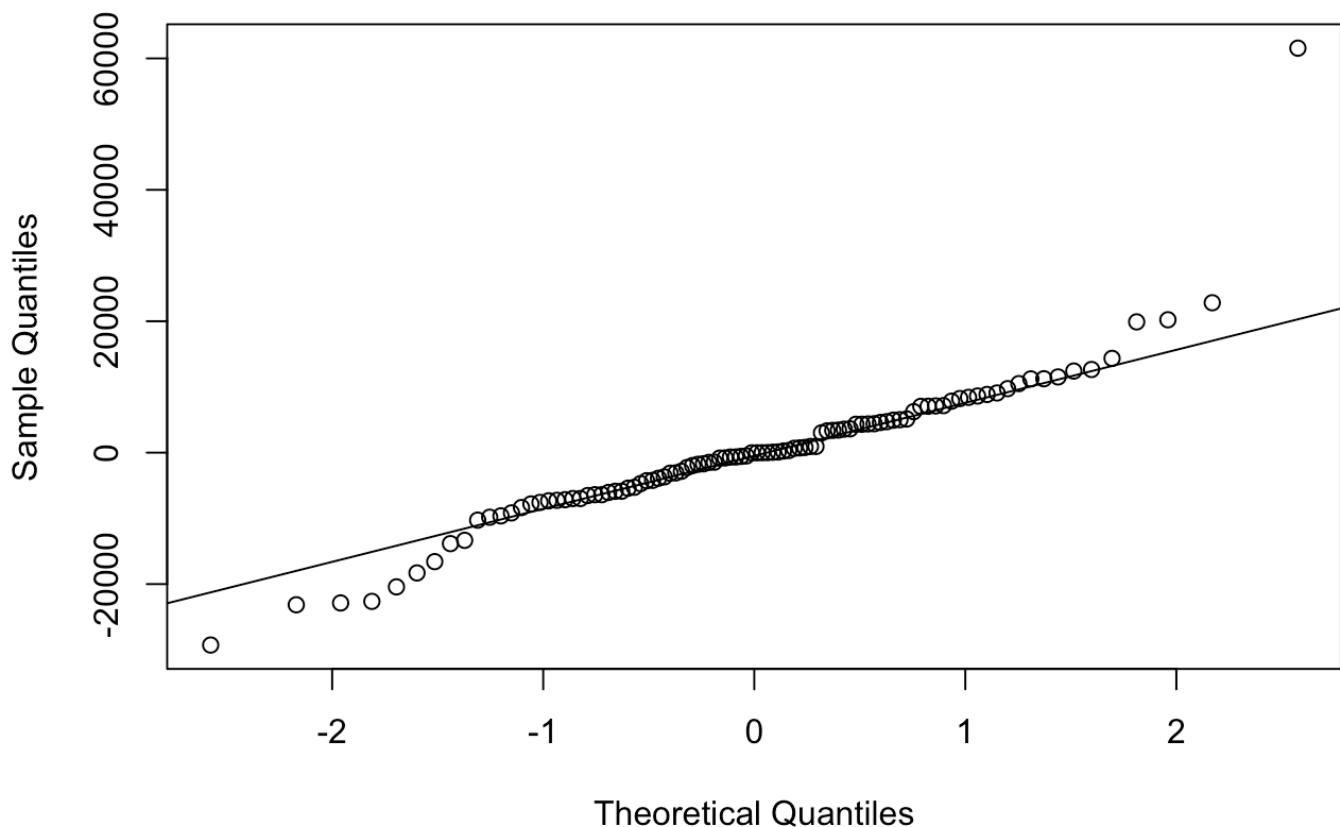
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

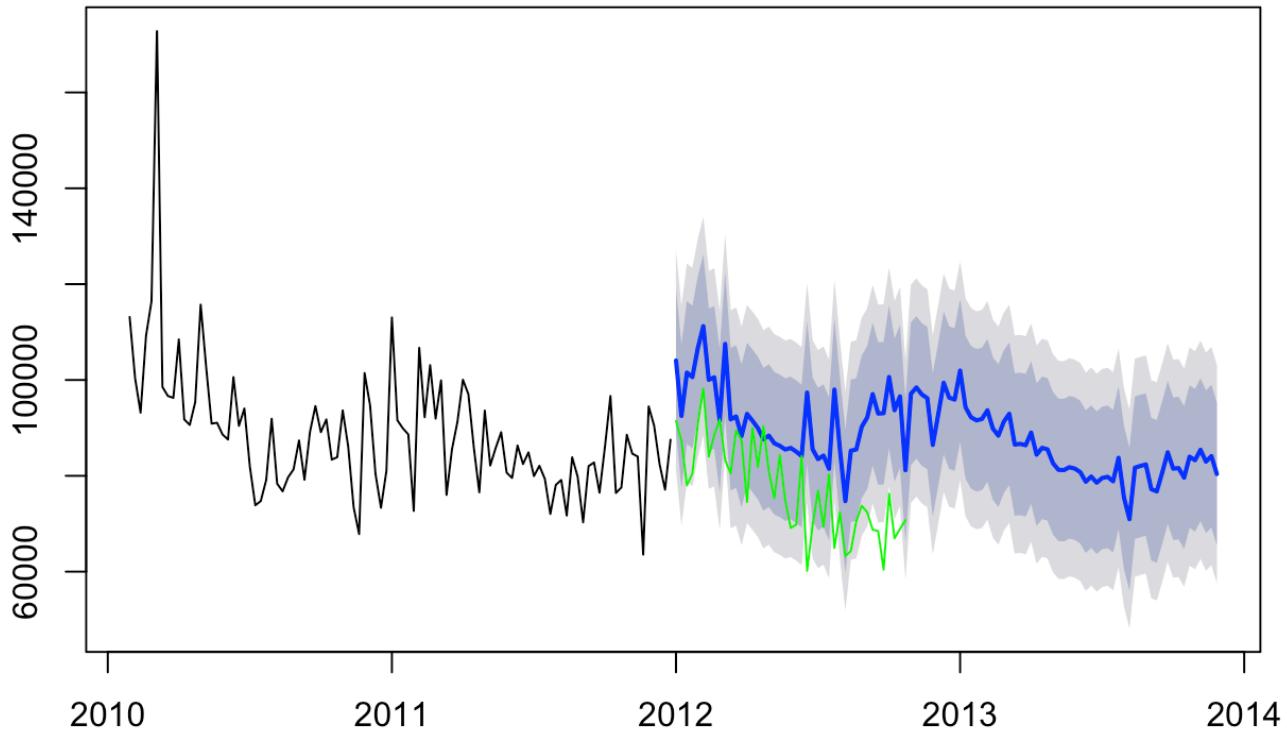

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "3  out of  25  Completed"
## [1] "12 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  2 2 2 2 2 2 2 2 2 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
##   $ 7          : 
##   $ 8          : 
##   $ 9          : 
##   $ 10         : 
##   $ IsHoliday  : logi  FALSE TRUE FALSE FALSE FALSE FALSE ...
##   $ Dept       : int  72 72 72 72 72 72 72 72 72 ...
##   $ Weekly_Sales: num  119610 109918 121968 80052 84175 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  202307 202307 202307 202307 202307 202307 202307 202307 202307 ...
##   $ 02307     : 
##   $ 202307    : 
##   $ Temperature: num  40.2 38.5 39.7 46.1 47.2 ...
##   $ Fuel_Price : num  2.57 2.55 2.51 2.56 2.62 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  211 211 211 211 211 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
## 
## 
##   iter imp variable

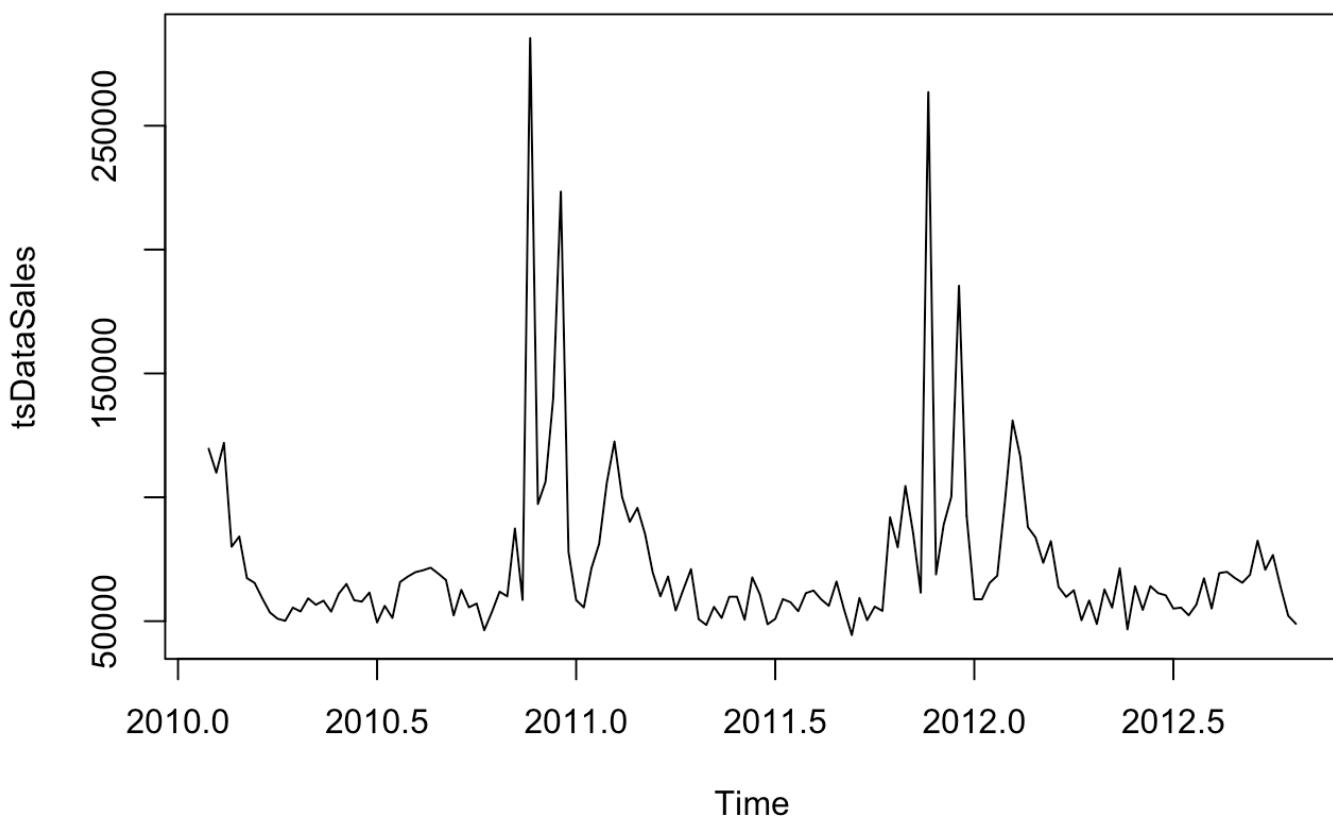
```

```

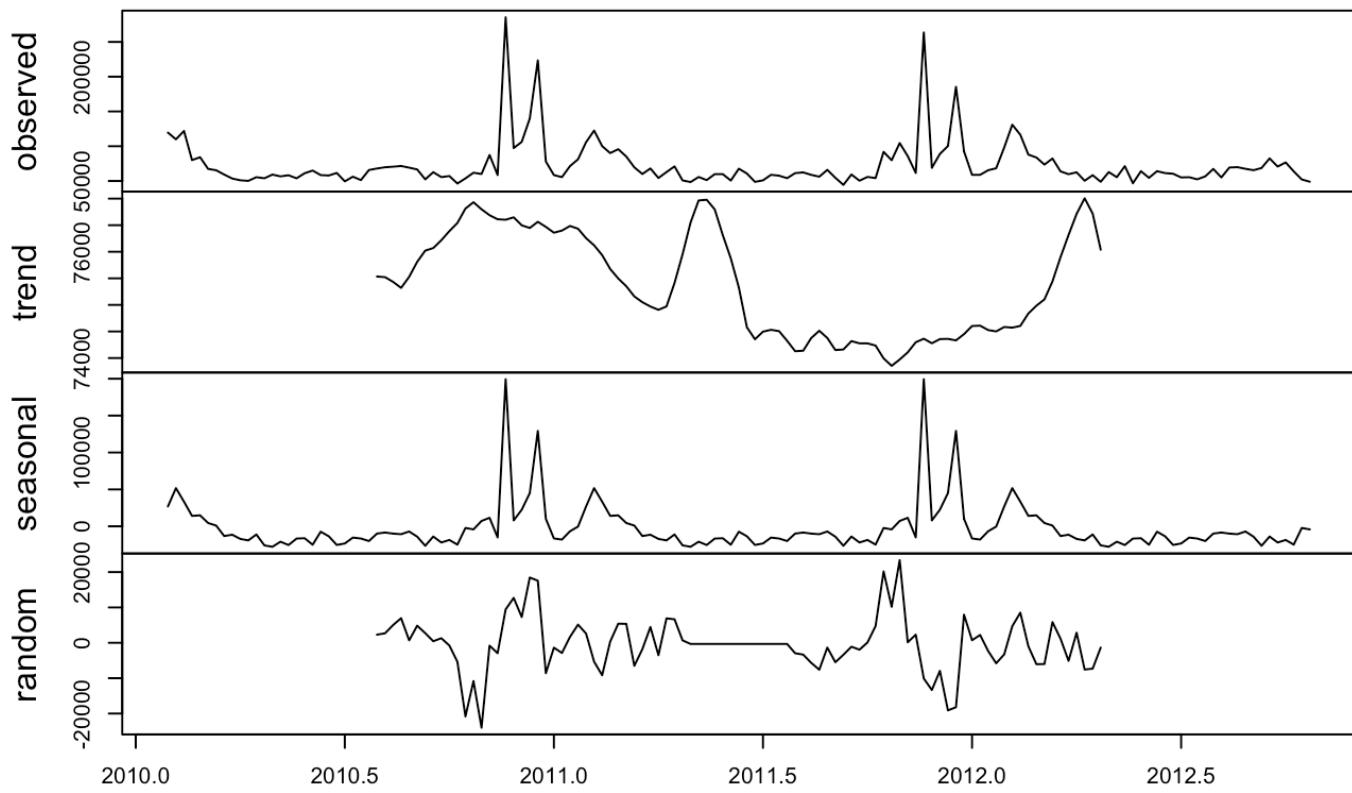
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5

```

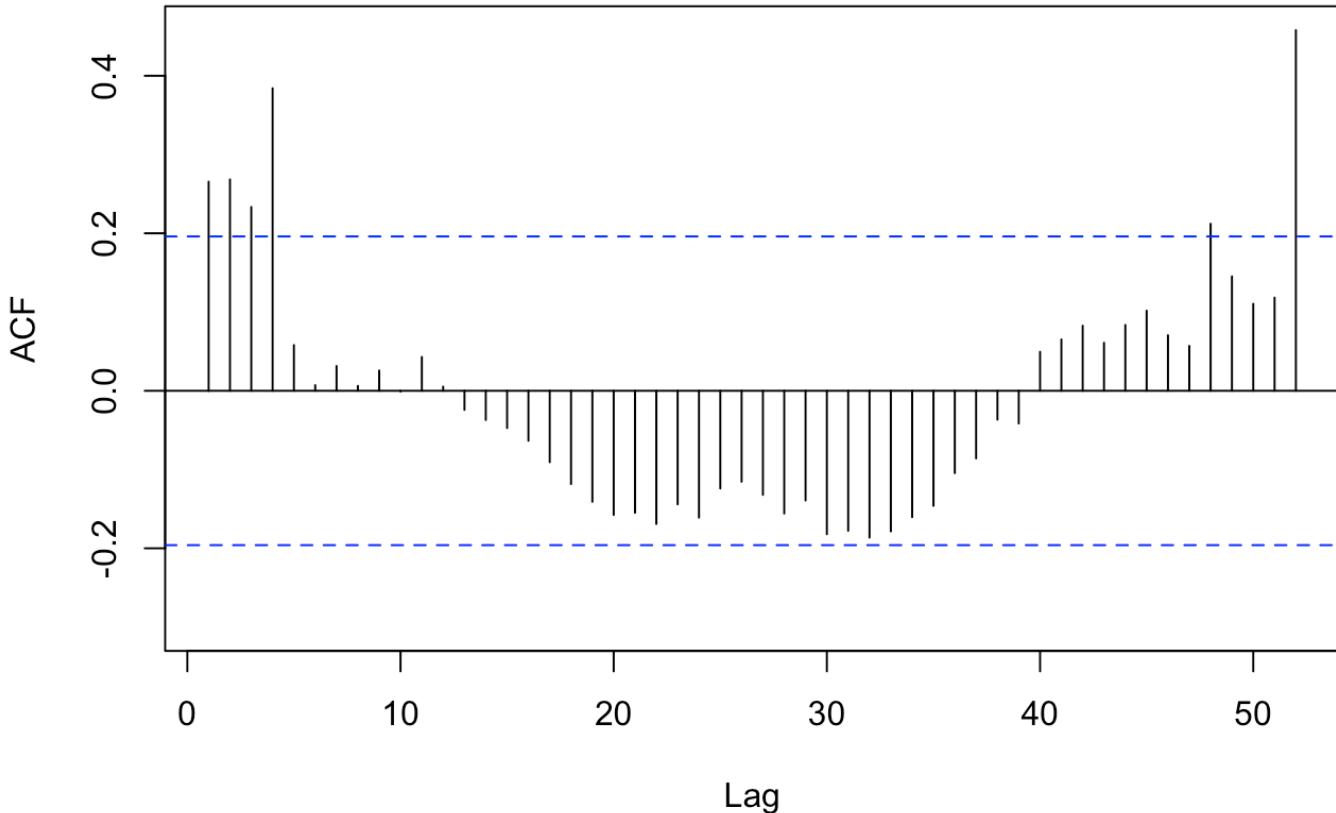
```
## [1] "Showing the results of store = 2 department = 72"
```



Decomposition of additive time series



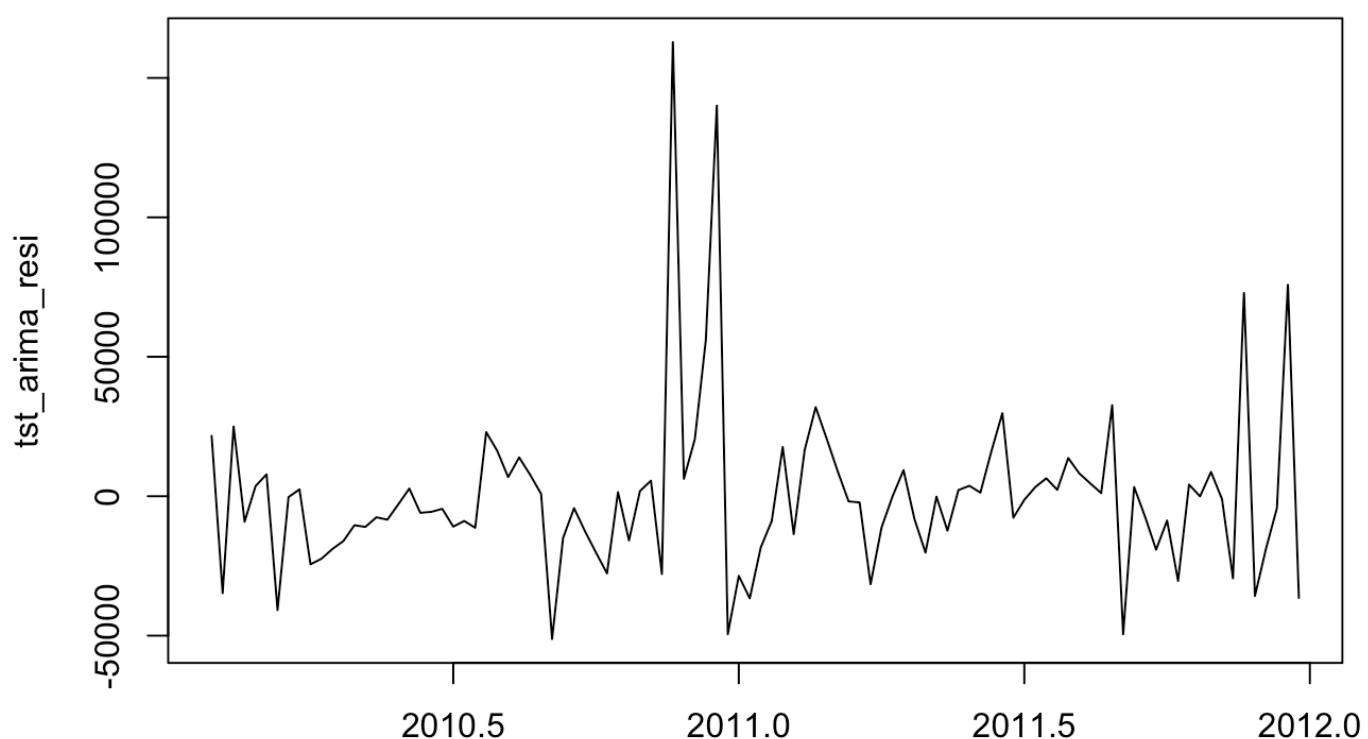
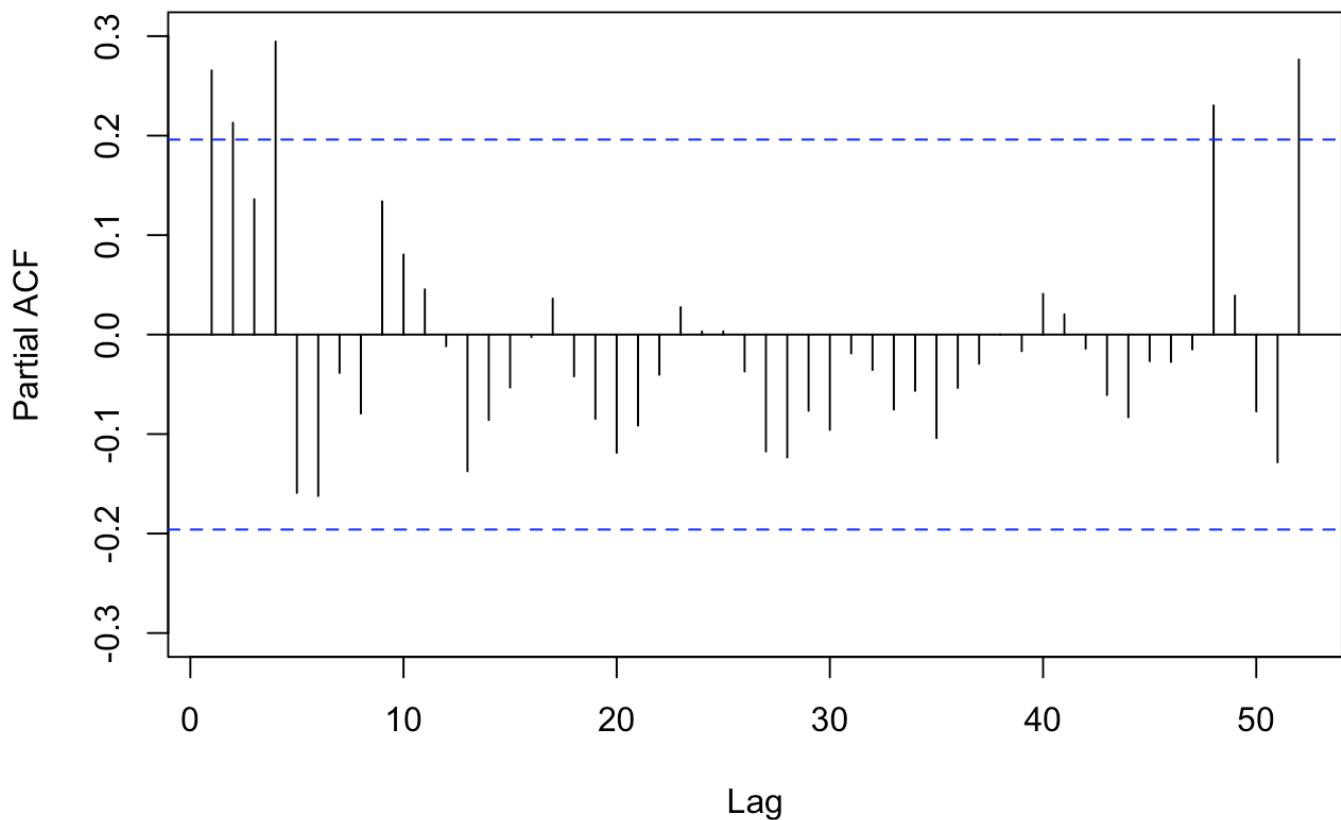
Time

Series train_sales

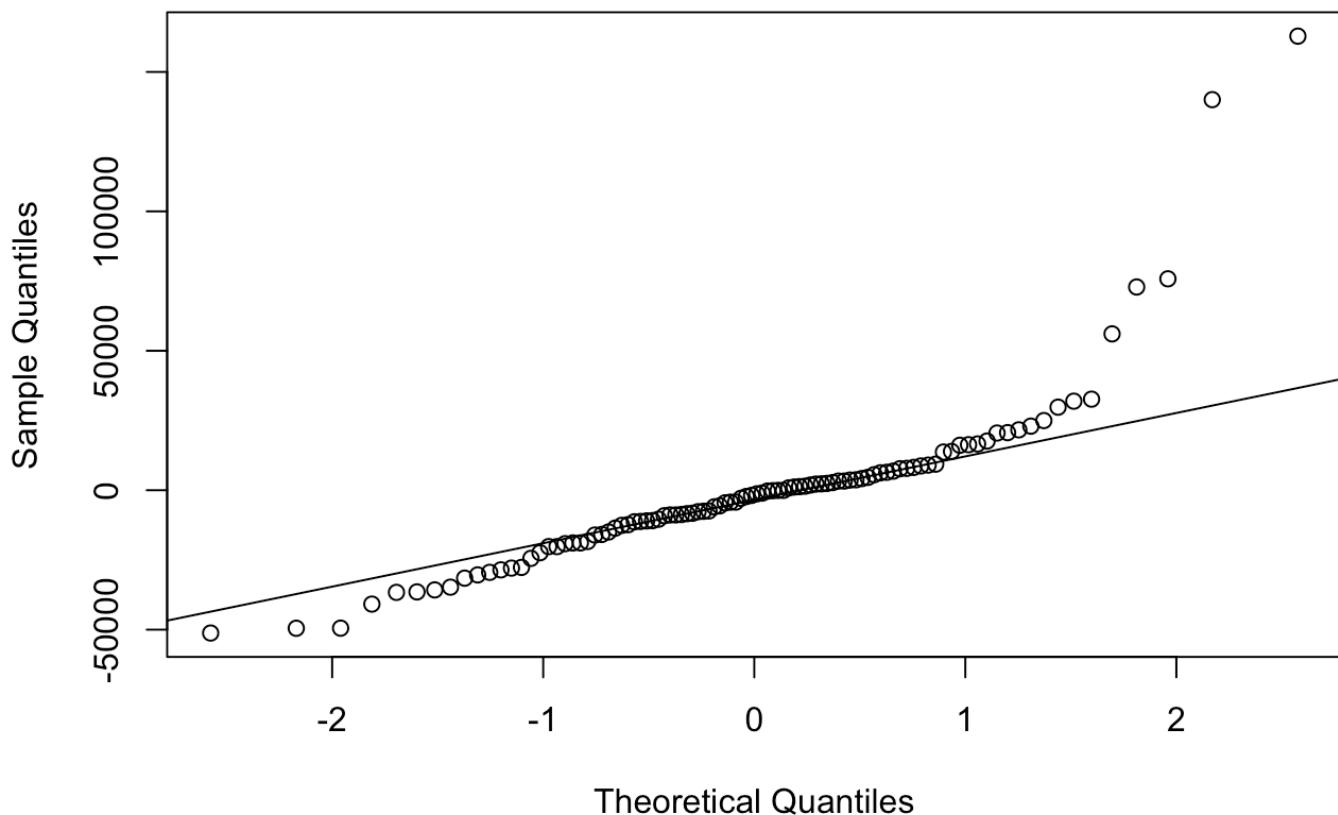
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

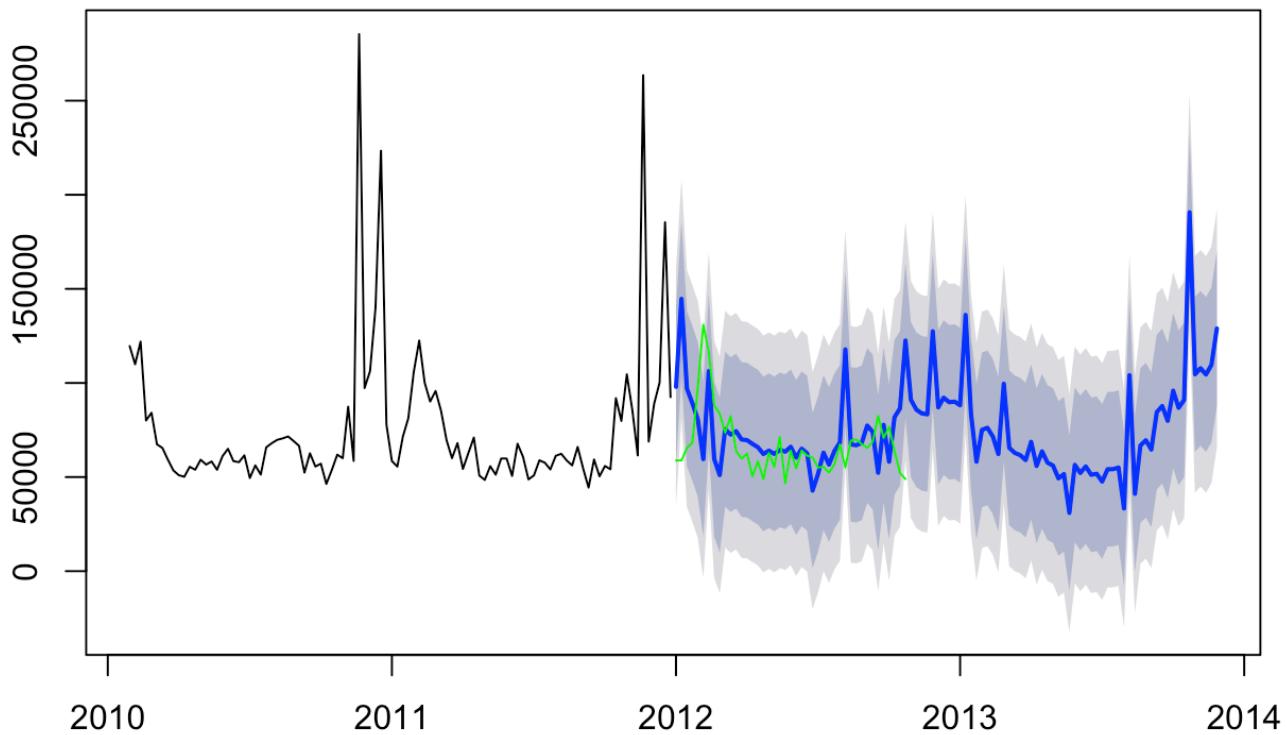

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



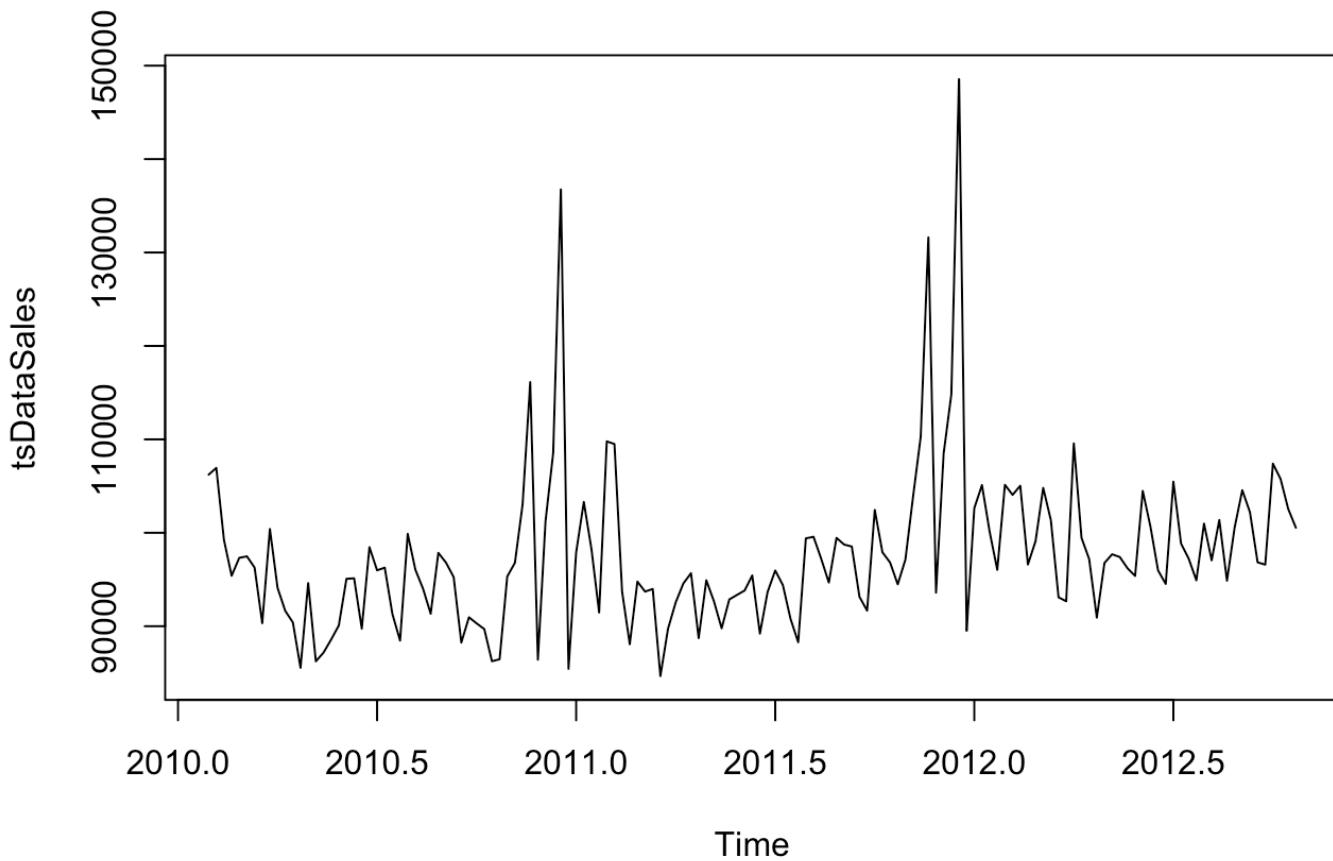
```

## [1] "4 out of 25 Completed"
## [1] "16 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 2 2 2 2 2 2 2 2 2 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept        : int 90 90 90 90 90 90 90 90 90 ...
## $ Weekly_Sales: num 106223 106948 99233 95404 97319 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int 202307 202307 202307 202307 202307 202307 202307 202307 202307 ...
## $ Temperature : num 40.2 38.5 39.7 46.1 47.2 ...
## $ Fuel_Price  : num 2.57 2.55 2.51 2.56 2.62 ...
## $ MarkDown1   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num NA NA NA NA NA NA NA NA NA ...
## $ CPI         : num 211 211 211 211 211 ...
## $ Unemployment: num 8.32 8.32 8.32 8.32 8.32 ...
##
## iter imp variable

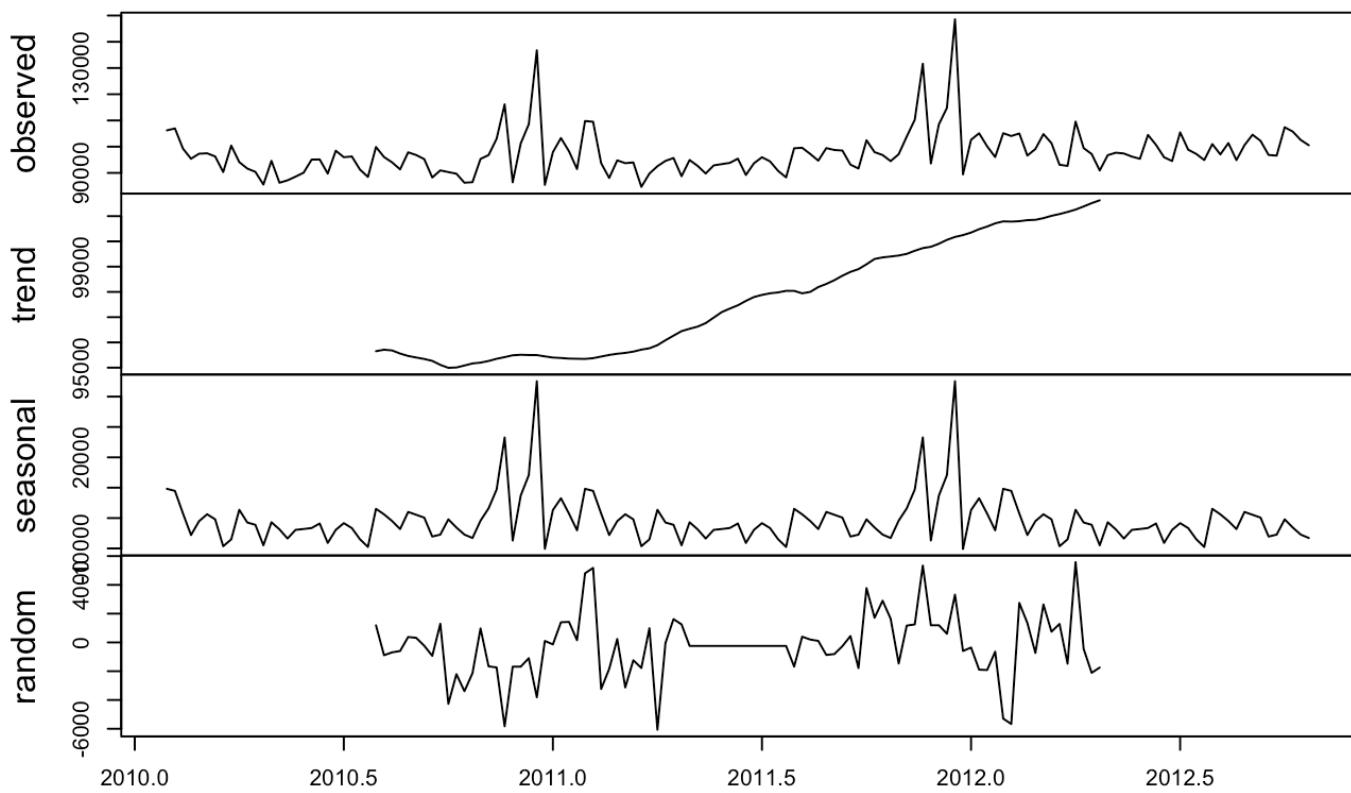
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

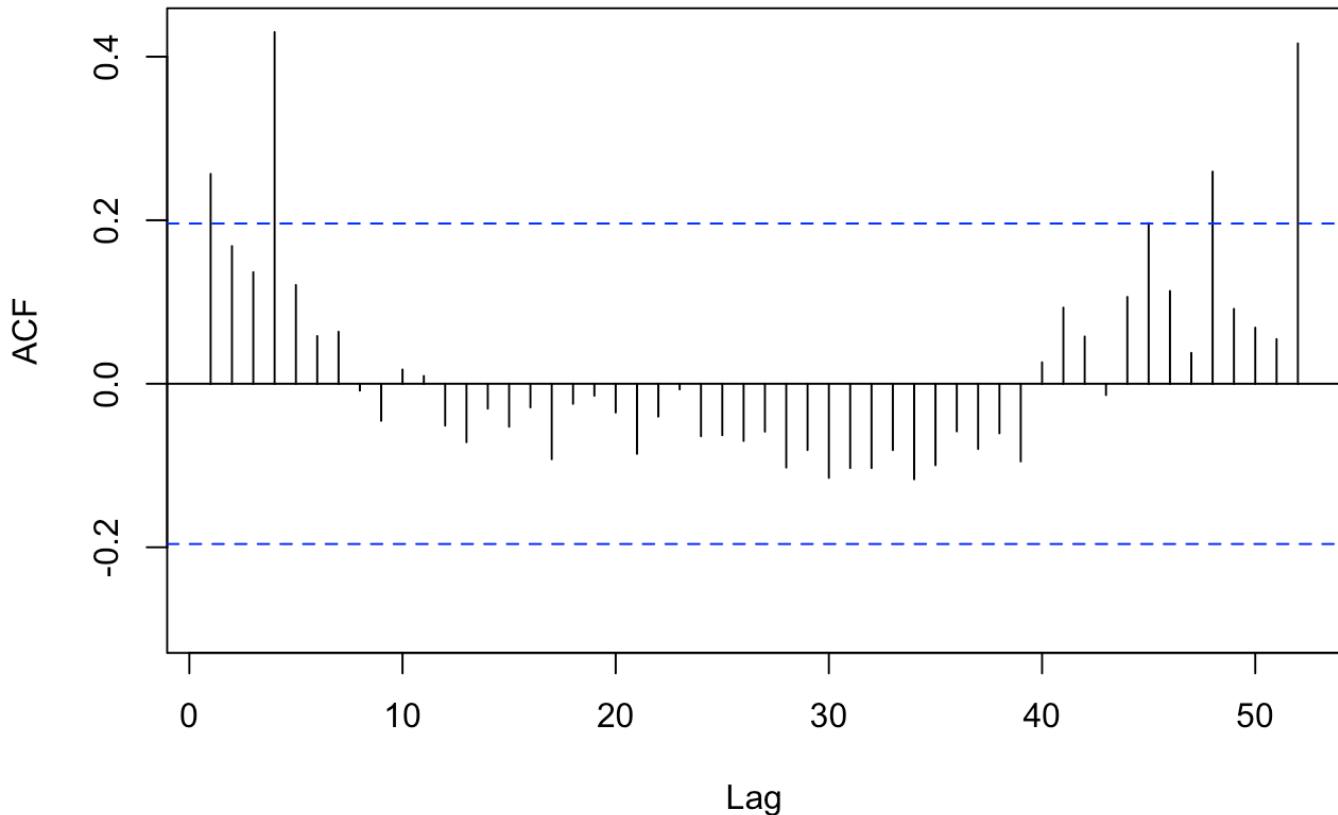
```
## [1] "Showing the results of store = 2 department = 90"
```



Decomposition of additive time series



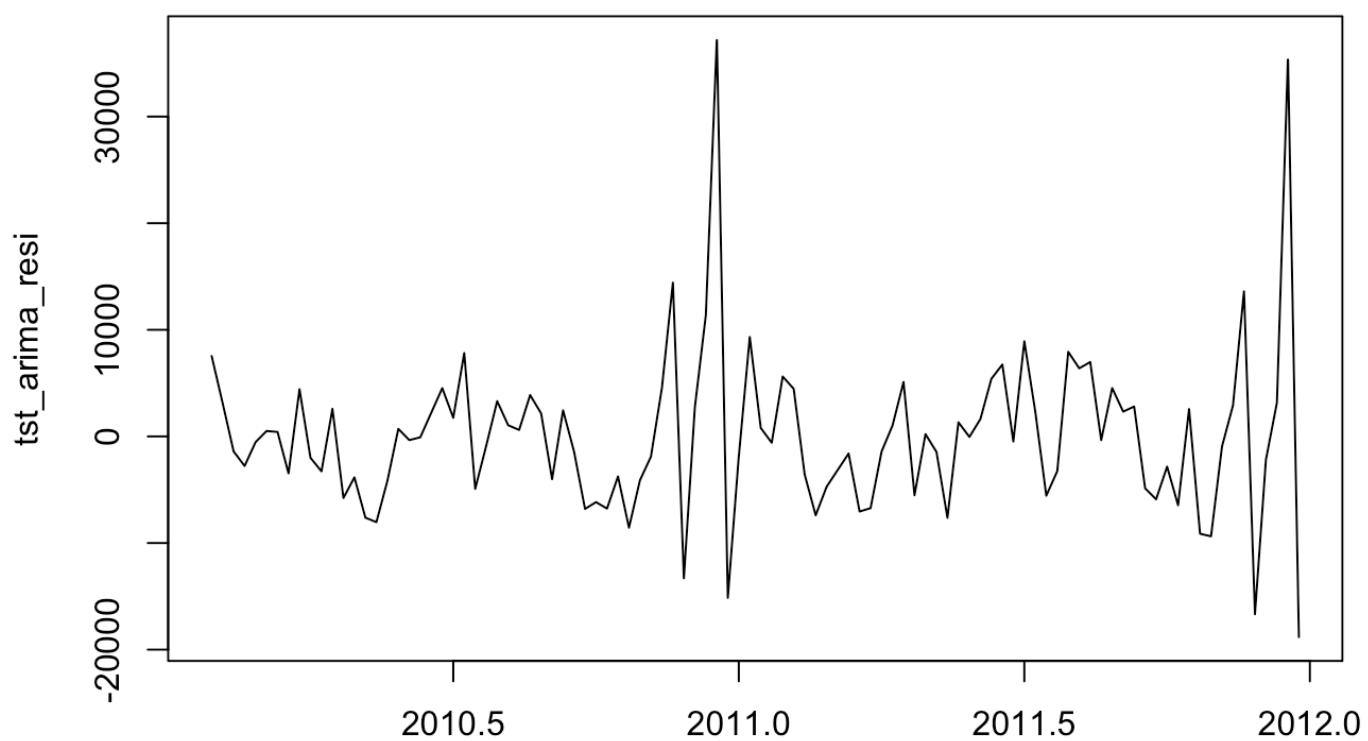
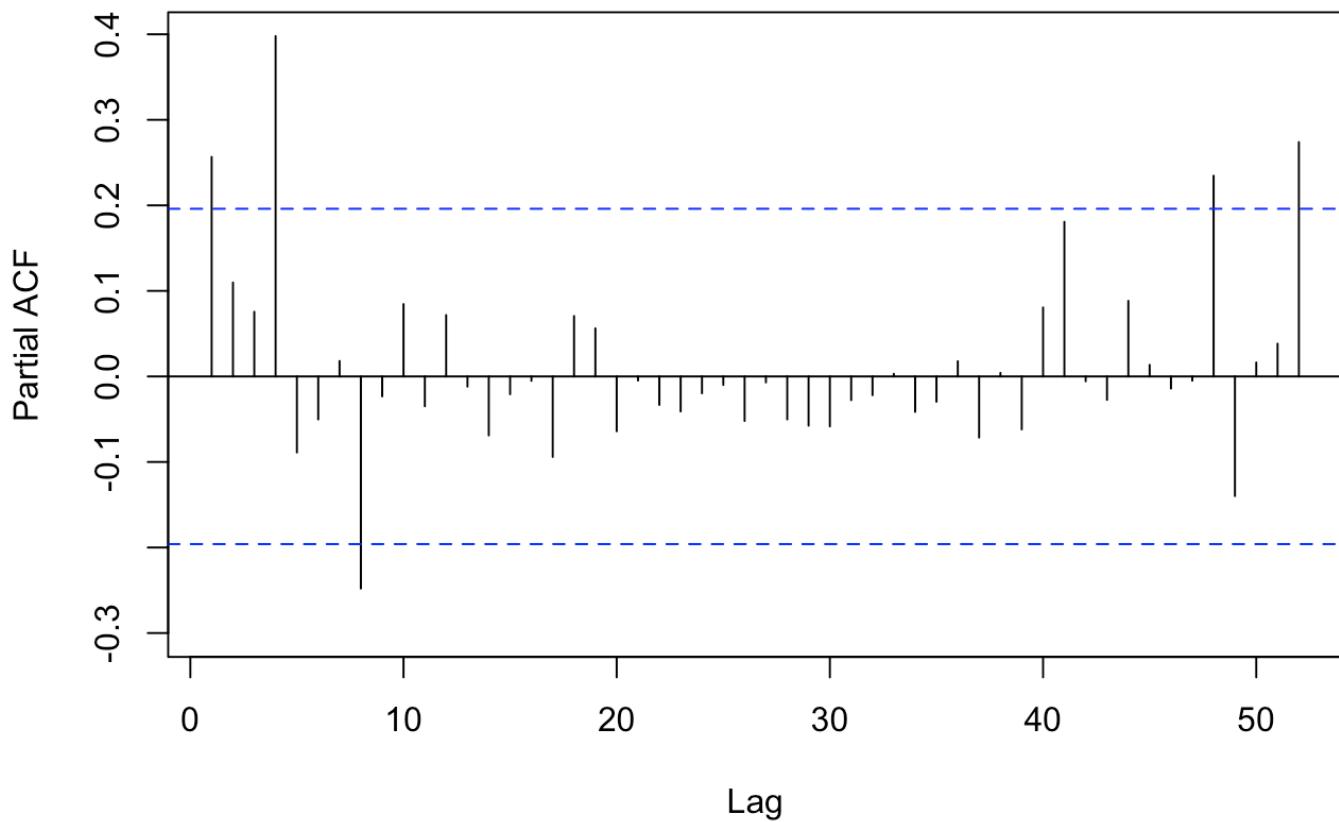
Time

Series train_sales

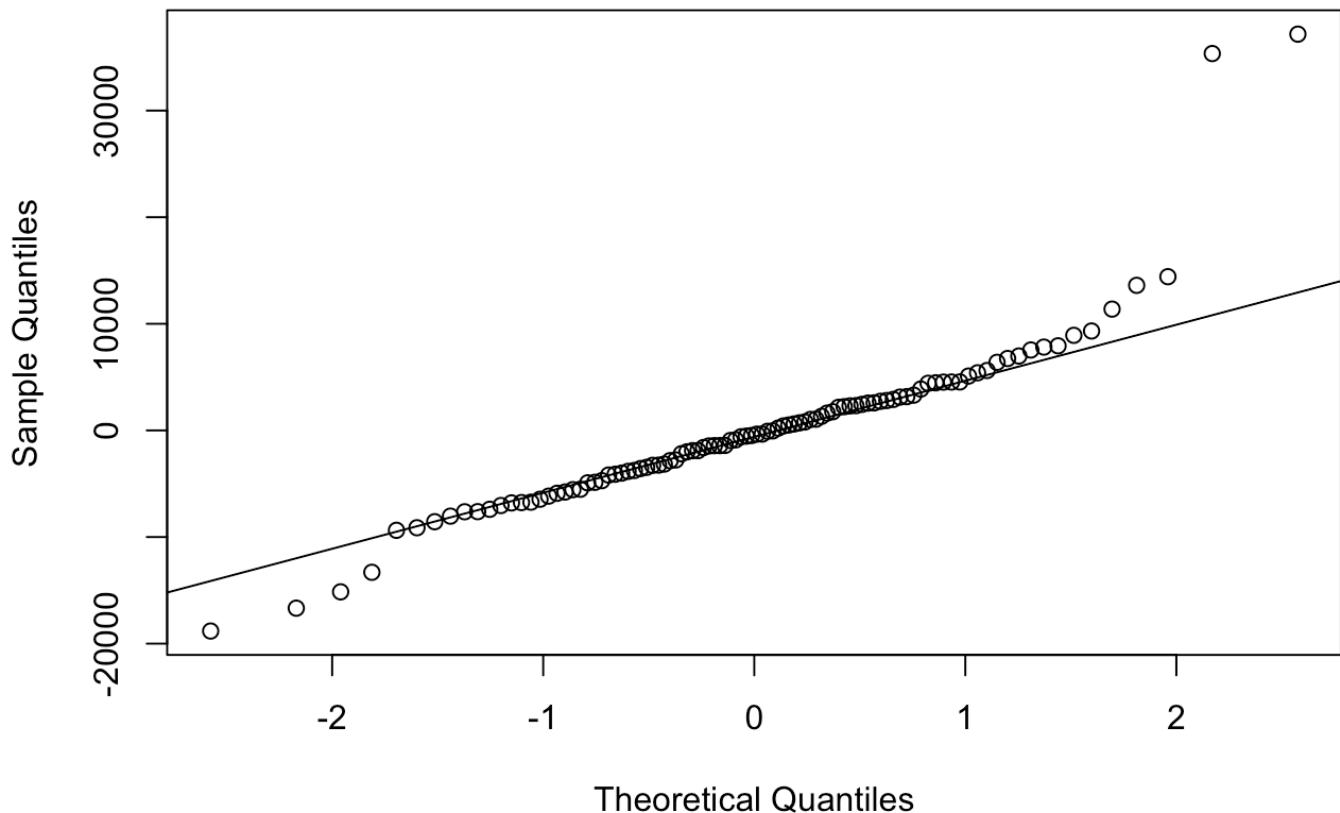
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

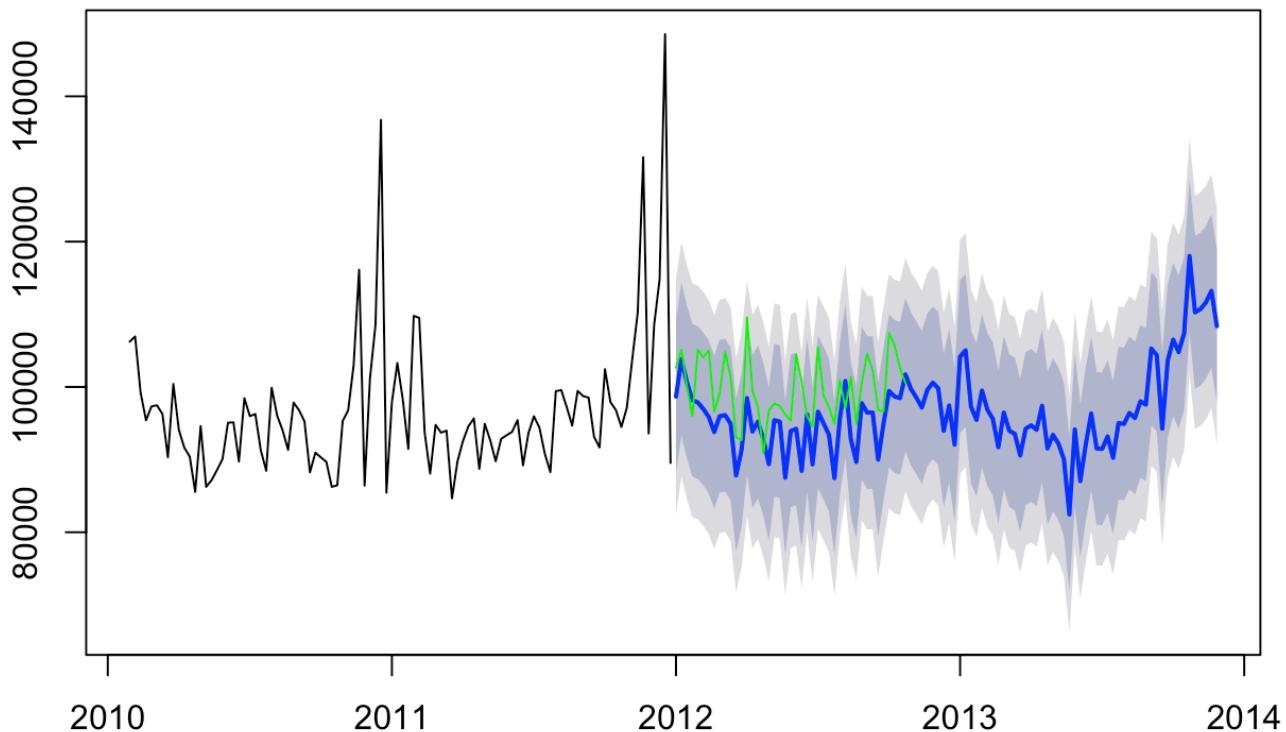

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "5 out of 25 Completed"
## [1] "20 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 4 4 4 4 4 4 4 4 4 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE FALSE ...
## $ Dept        : int 92 92 92 92 92 92 92 92 92 ...
## $ Weekly_Sales: num 165766 163407 155428 146064 152309 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int 205863 205863 205863 205863 205863 205863 205863 205863 205863 ...
## $ Temperature : num 43.8 28.8 36.5 41.4 43.5 ...
## $ Fuel_Price  : num 2.6 2.57 2.54 2.59 2.65 ...
## $ MarkDown1   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num NA NA NA NA NA NA NA NA NA ...
## $ CPI         : num 126 126 127 127 127 ...
## $ Unemployment: num 8.62 8.62 8.62 8.62 8.62 ...
##
## iter imp variable

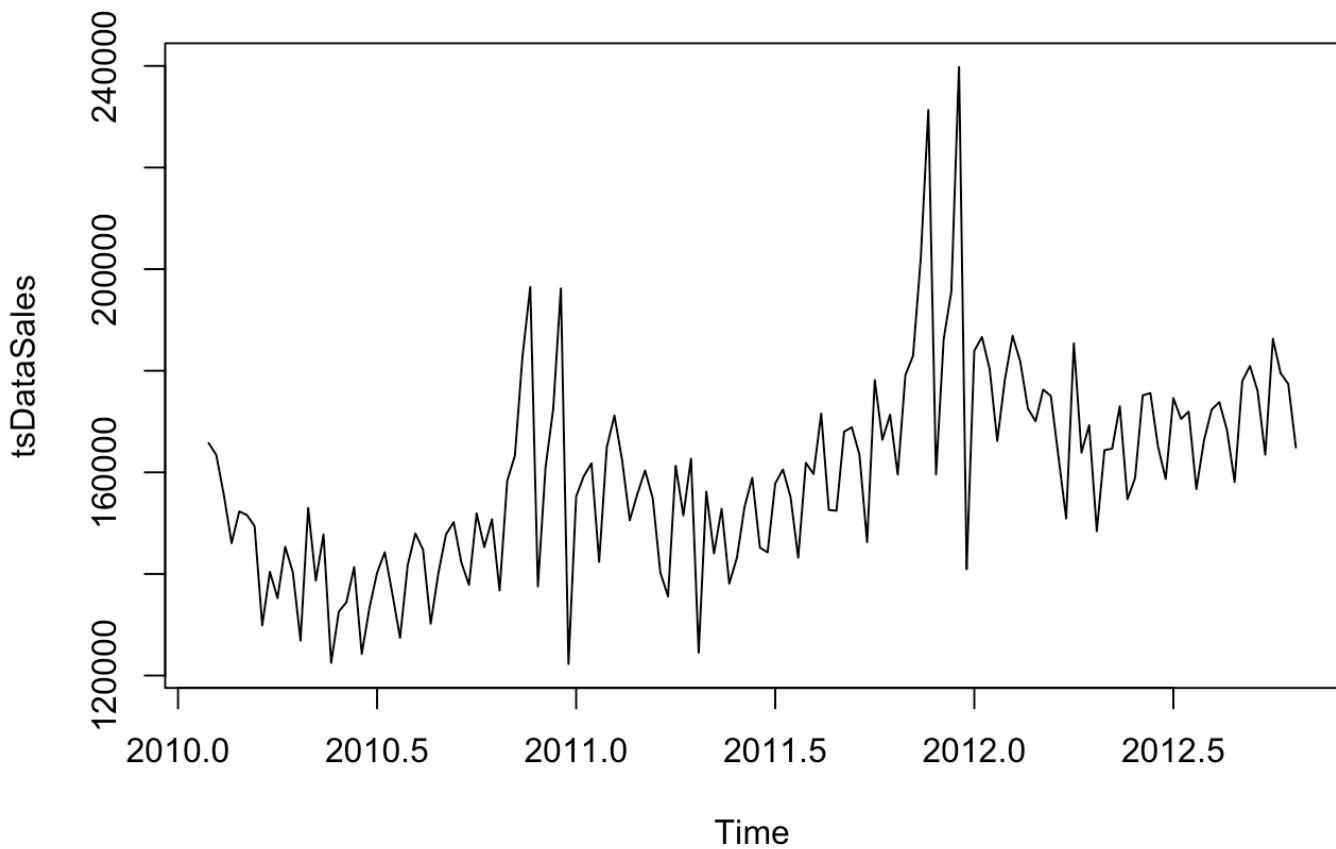
```

```

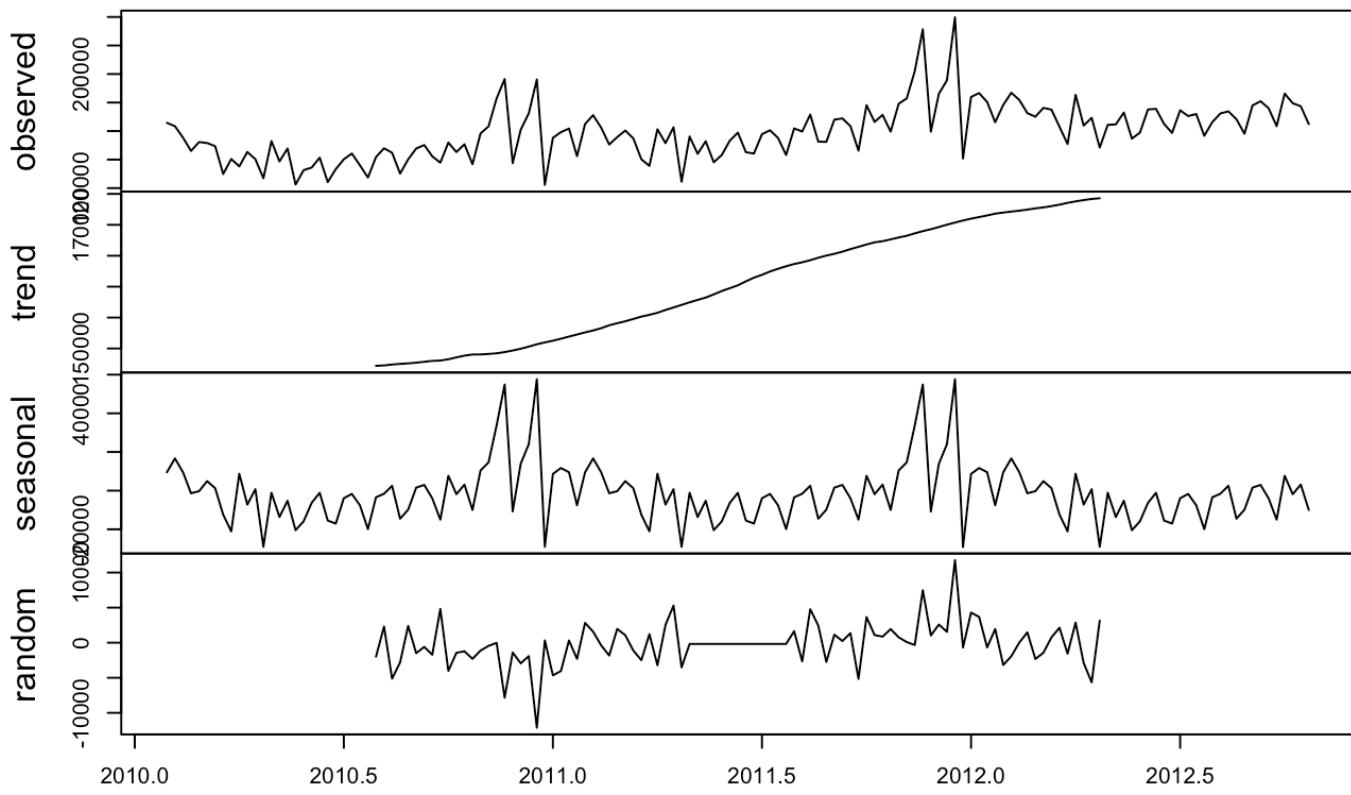
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5

```

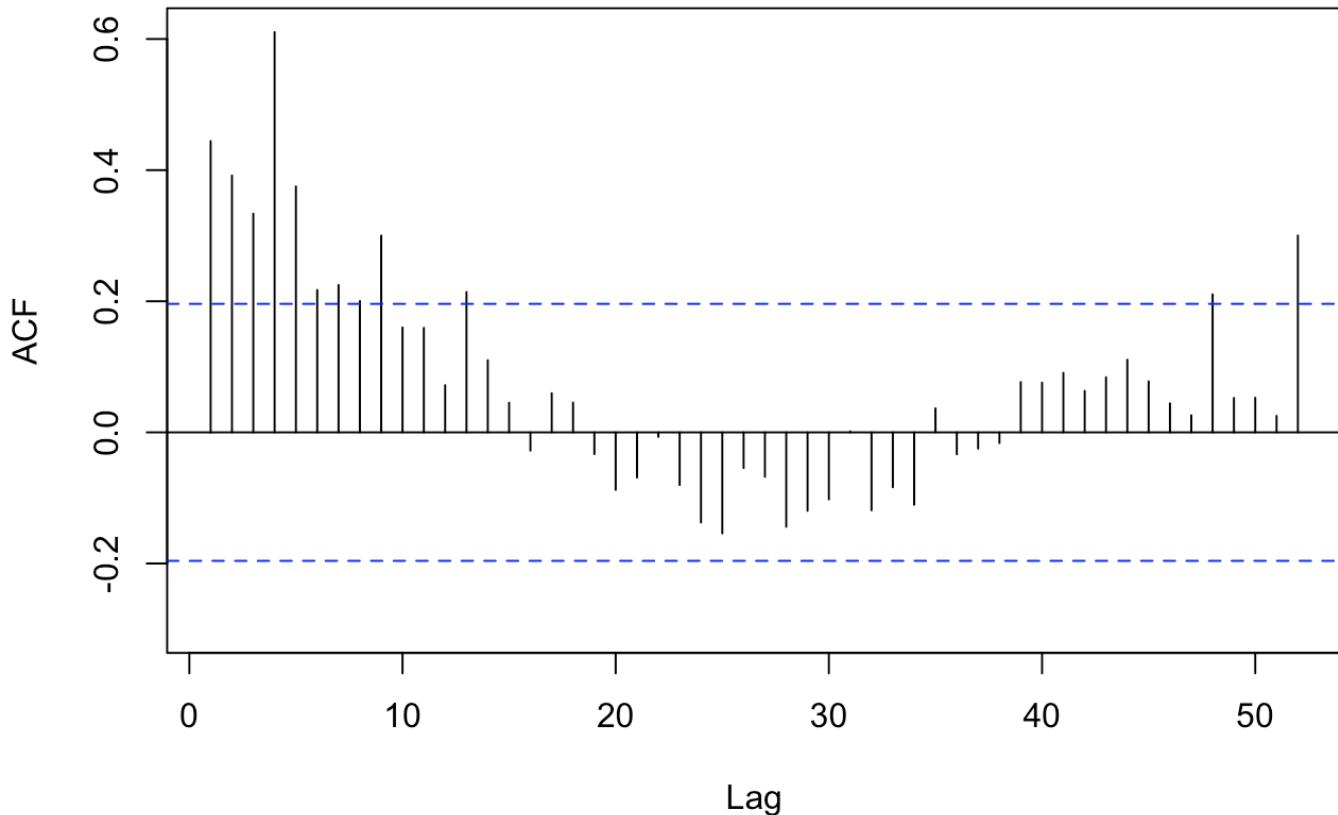
```
## [1] "Showing the results of store = 4 department = 92"
```



Decomposition of additive time series



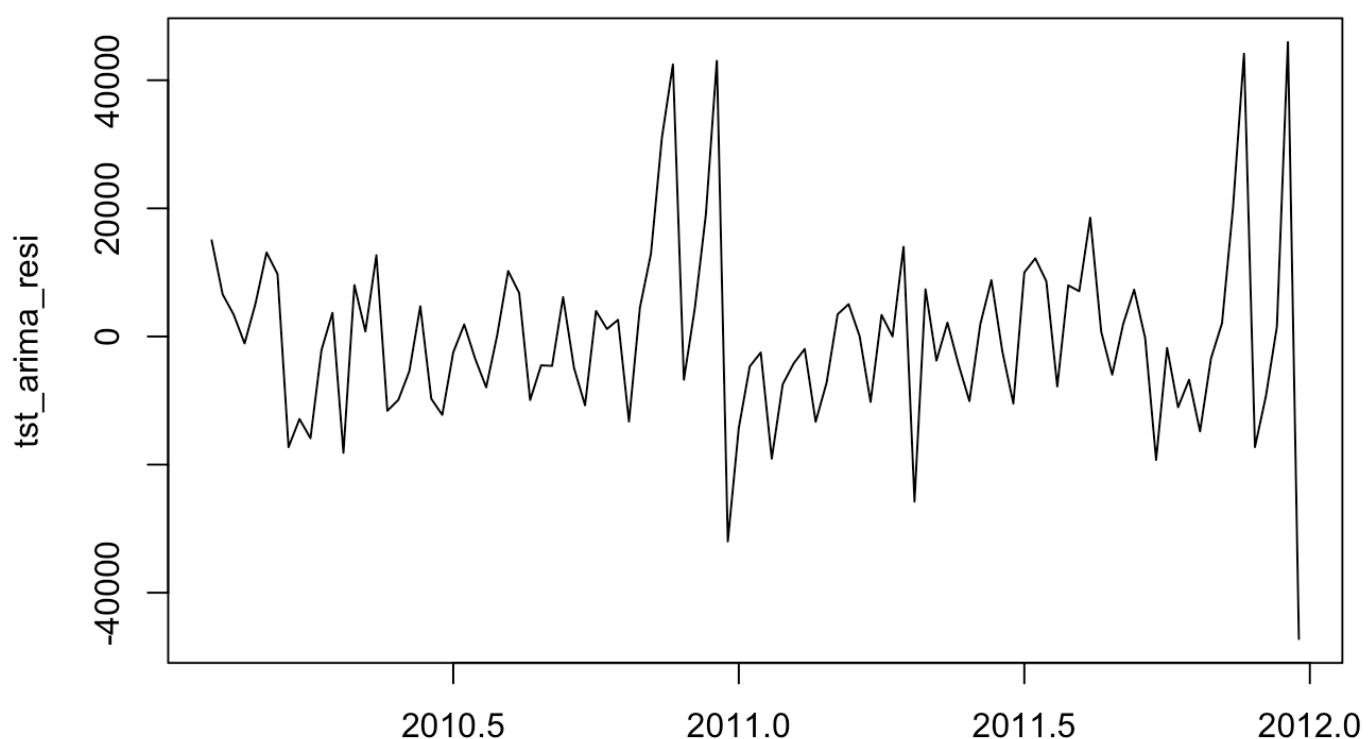
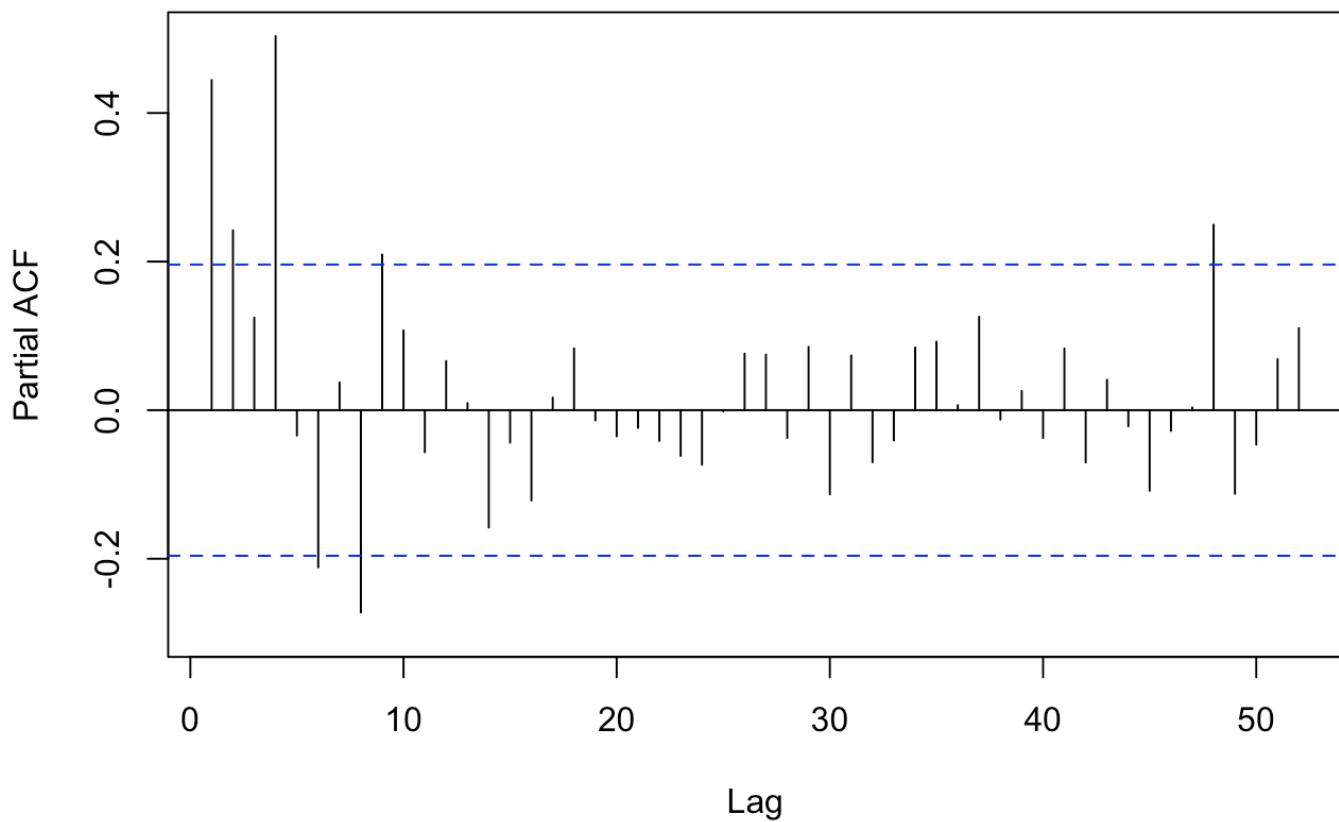
Time

Series train_sales

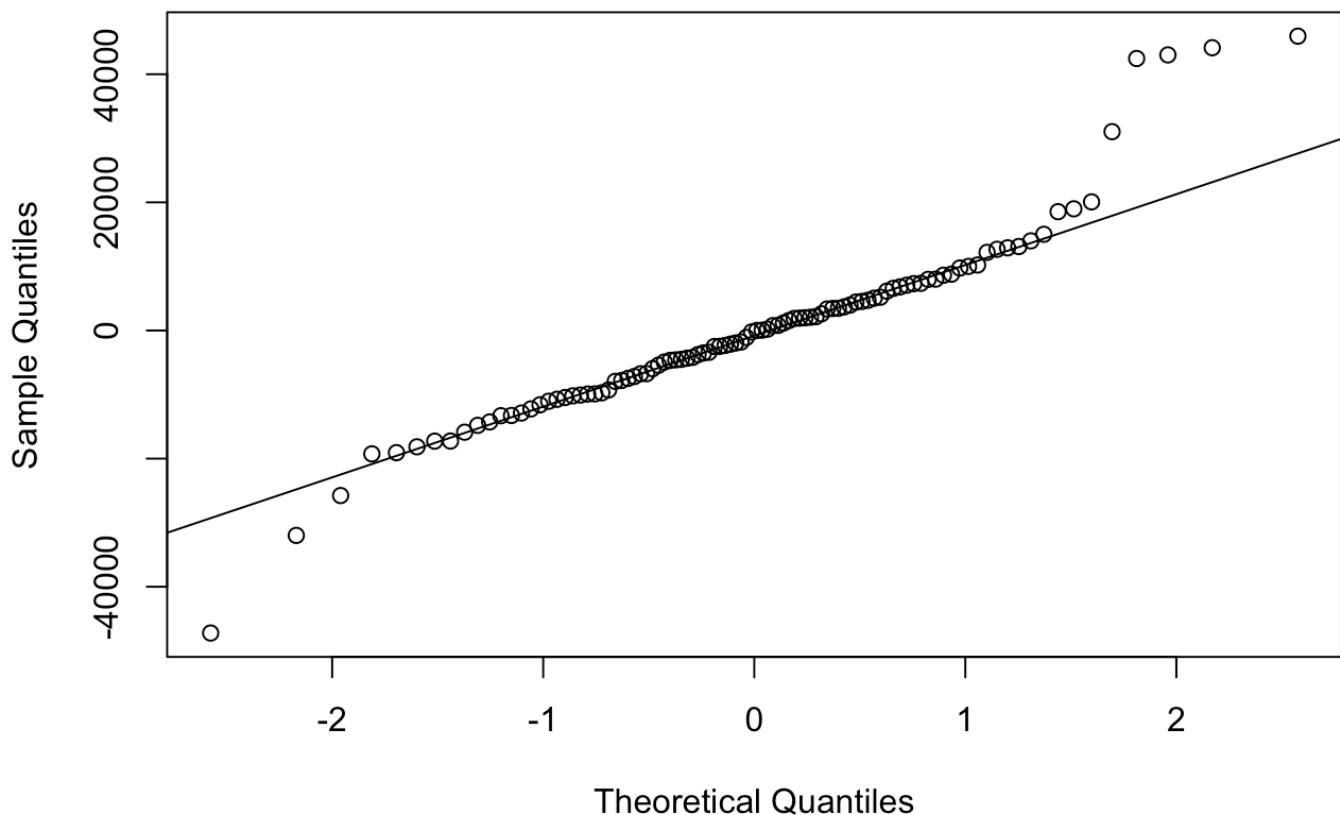
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

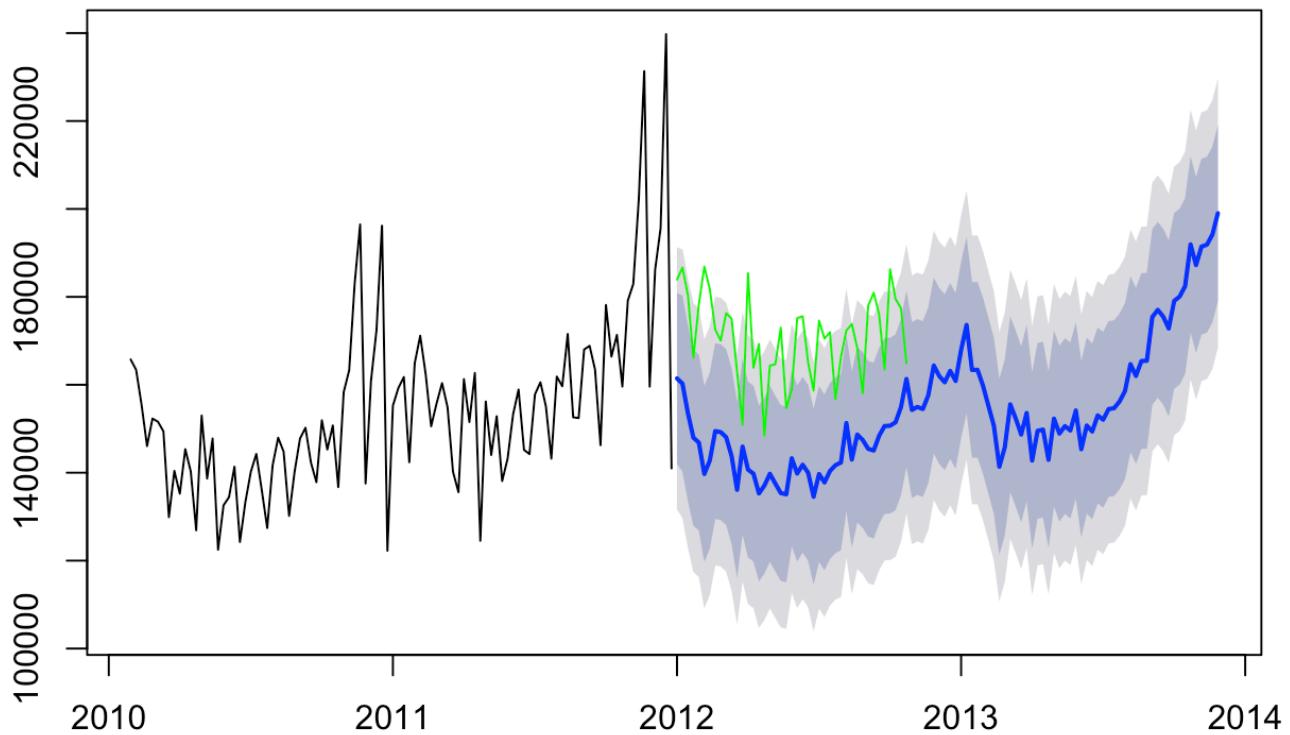

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "6  out of  25  Completed"
## [1] "24 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  4 4 4 4 4 4 4 4 4 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  130722 135622 125396 120346 127927 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  205863 205863 205863 205863 205863 205863 205863 205863 ...
##   $ Temperature: num  43.8 28.8 36.5 41.4 43.5 ...
##   $ Fuel_Price : num  2.6 2.57 2.54 2.59 2.65 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  126 126 127 127 127 ...
##   $ Unemployment: num  8.62 8.62 8.62 8.62 8.62 ...
##
## 
## iter imp variable

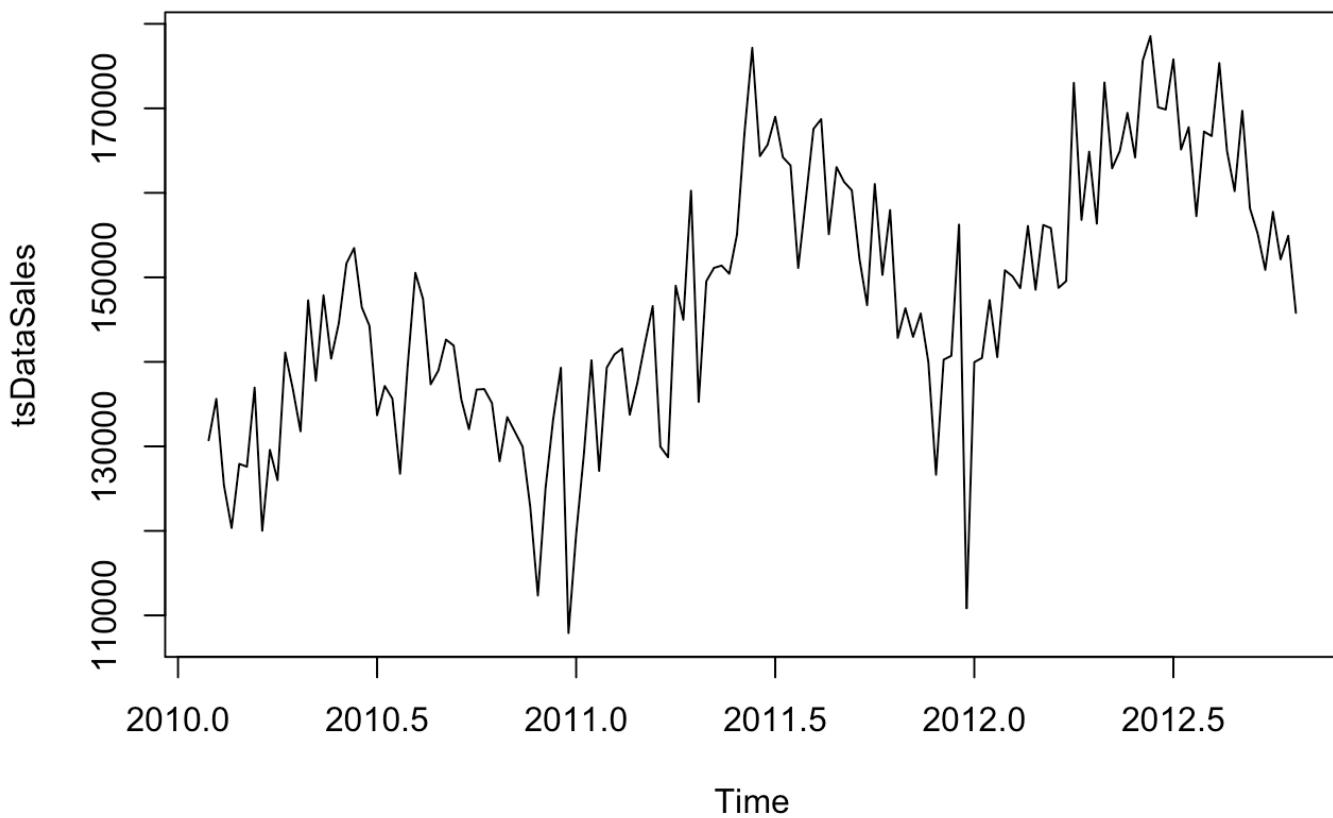
```

```

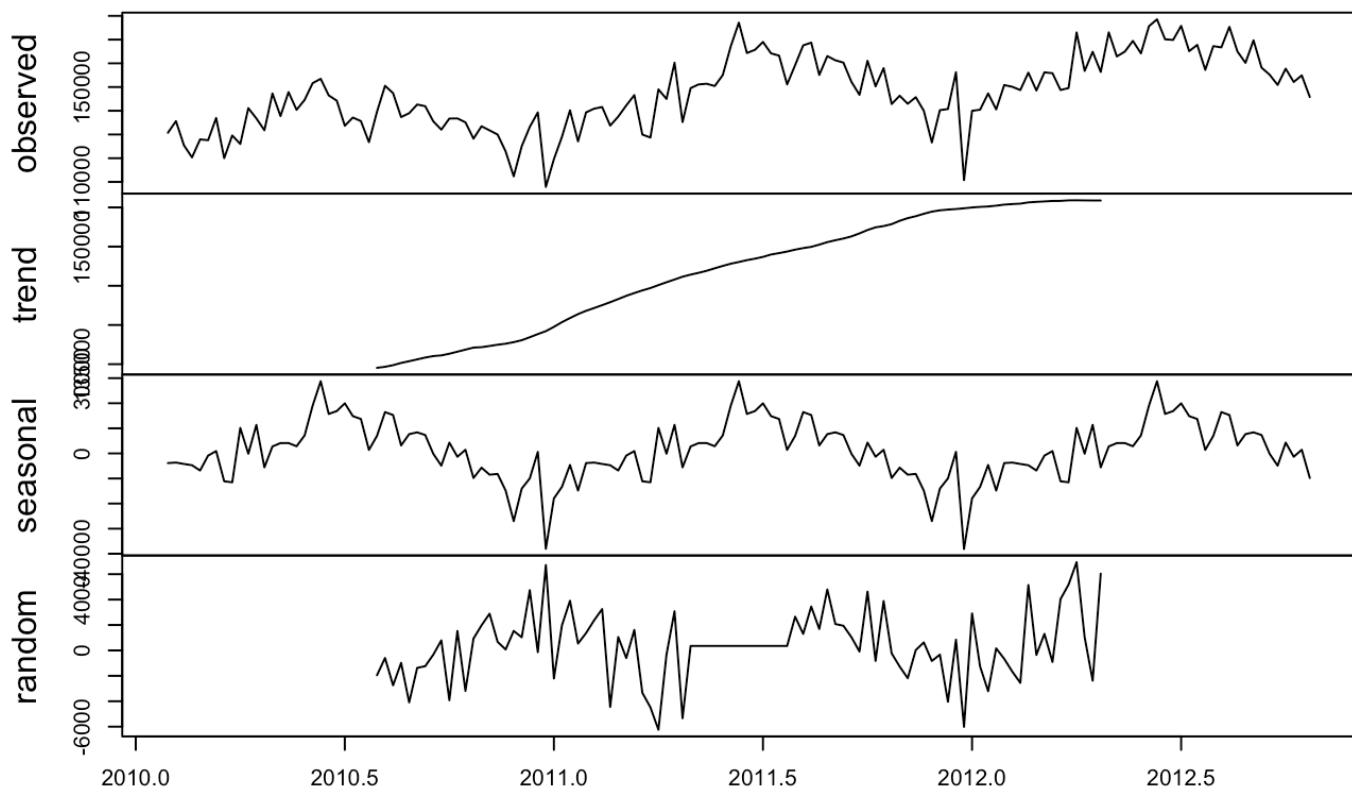
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5

```

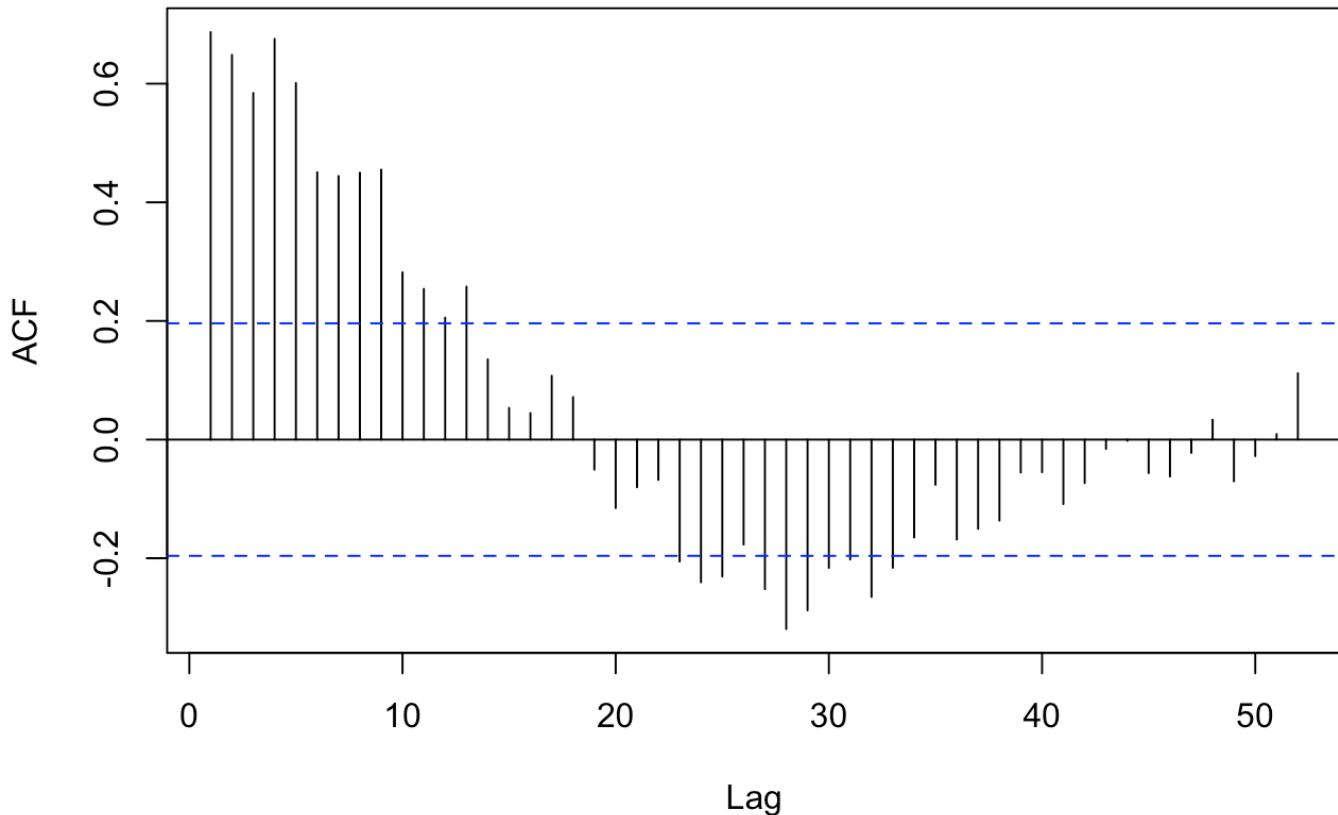
```
## [1] "Showing the results of store = 4 department = 95"
```



Decomposition of additive time series



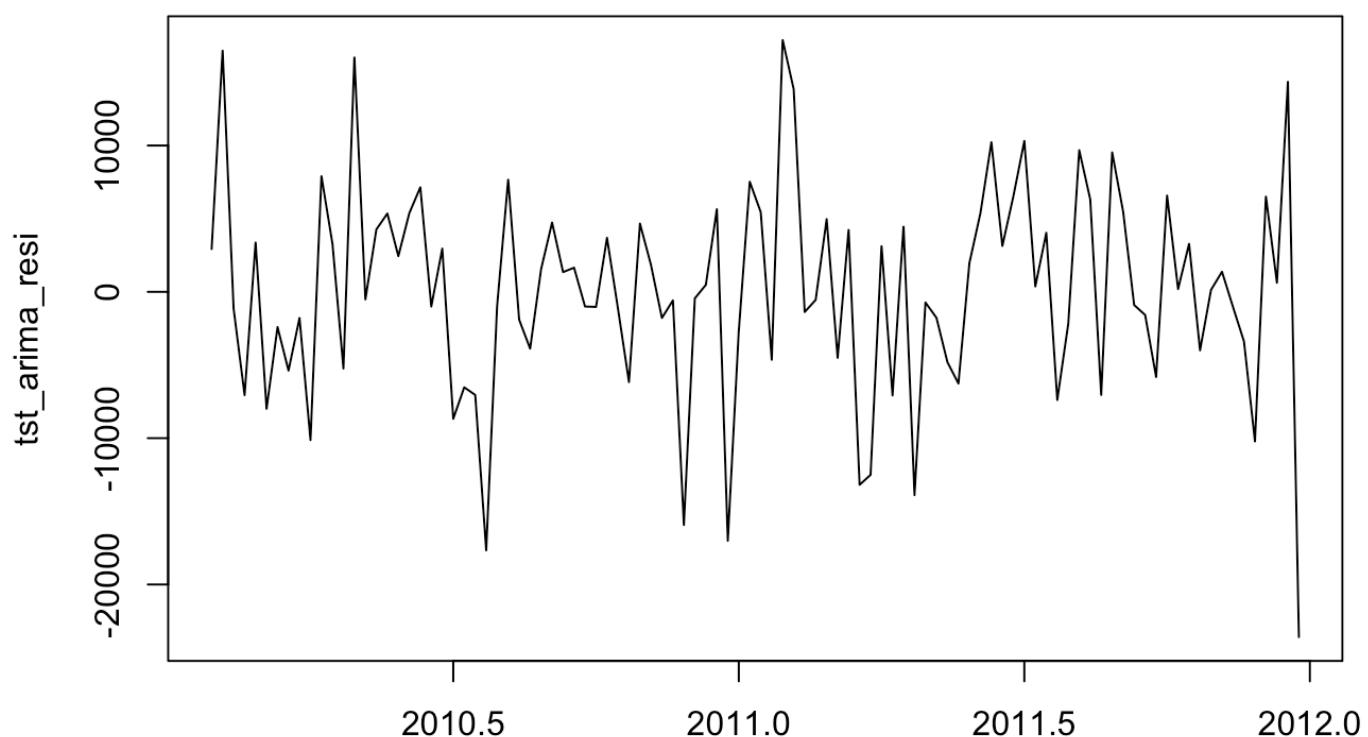
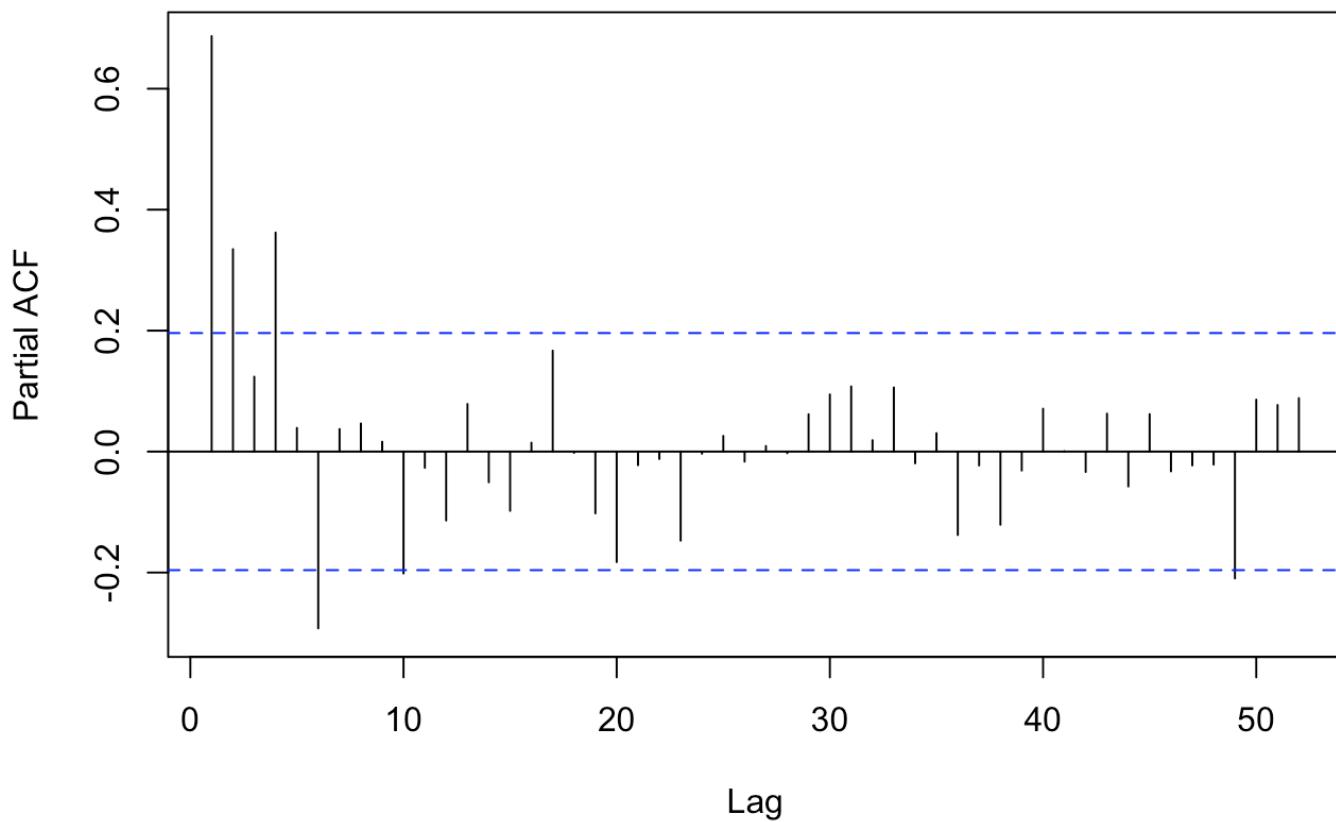
Time

Series train_sales

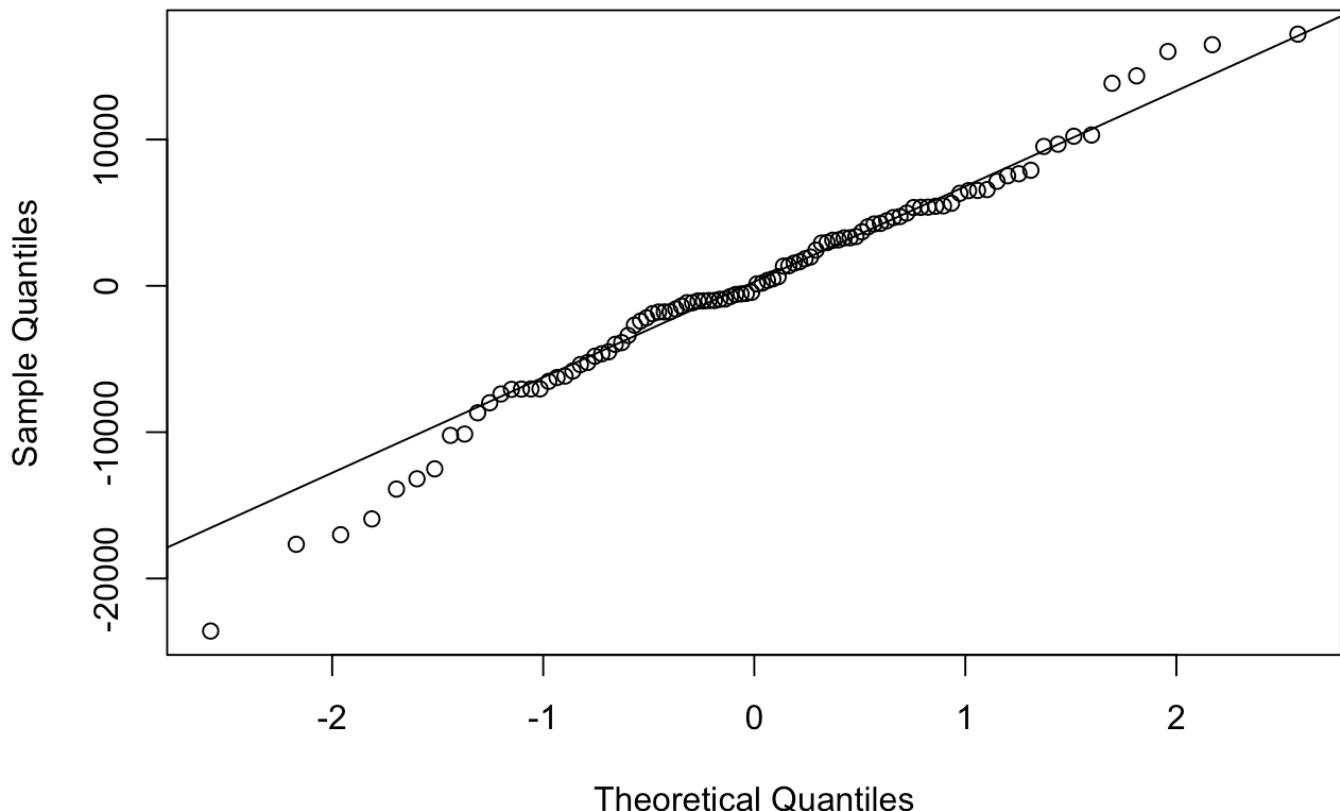
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

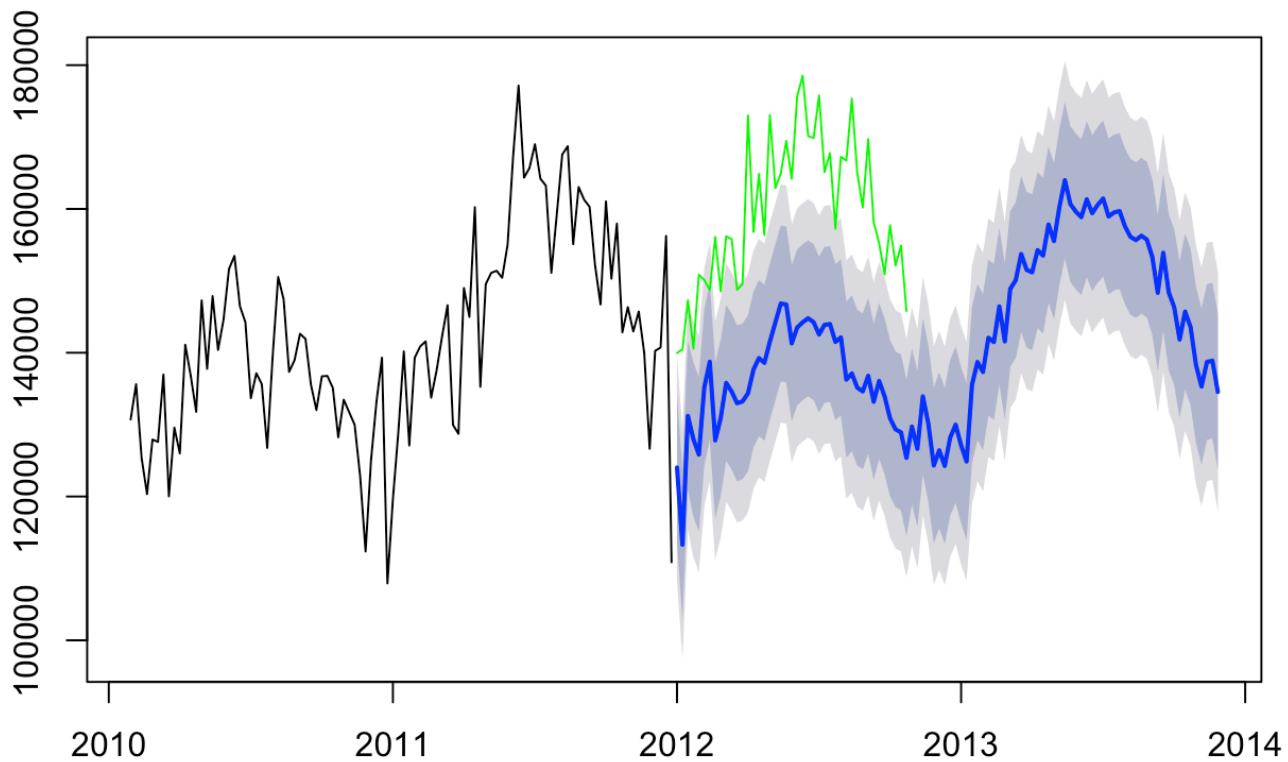

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



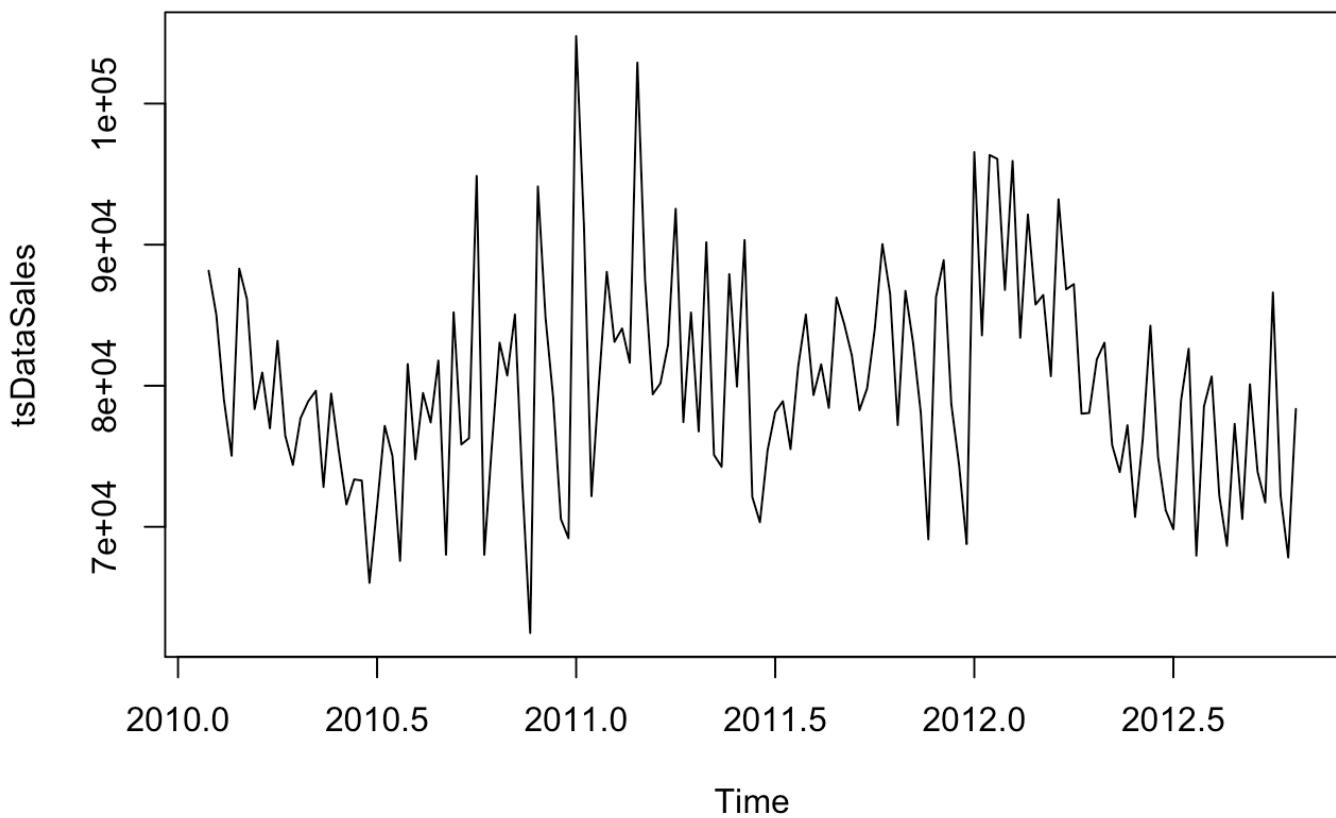
```

## [1] "7 out of 25 Completed"
## [1] "28 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 4 4 4 4 4 4 4 4 4 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept        : int 38 38 38 38 38 38 38 38 38 ...
## $ Weekly_Sales: num 88154 85039 78997 75039 88297 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int 205863 205863 205863 205863 205863 205863 205863 205863 205863 ...
## $ Temperature : num 43.8 28.8 36.5 41.4 43.5 ...
## $ Fuel_Price   : num 2.6 2.57 2.54 2.59 2.65 ...
## $ MarkDown1    : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2    : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3    : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4    : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5    : num NA NA NA NA NA NA NA NA NA ...
## $ CPI          : num 126 126 127 127 127 ...
## $ Unemployment: num 8.62 8.62 8.62 8.62 8.62 ...
##
## iter imp variable

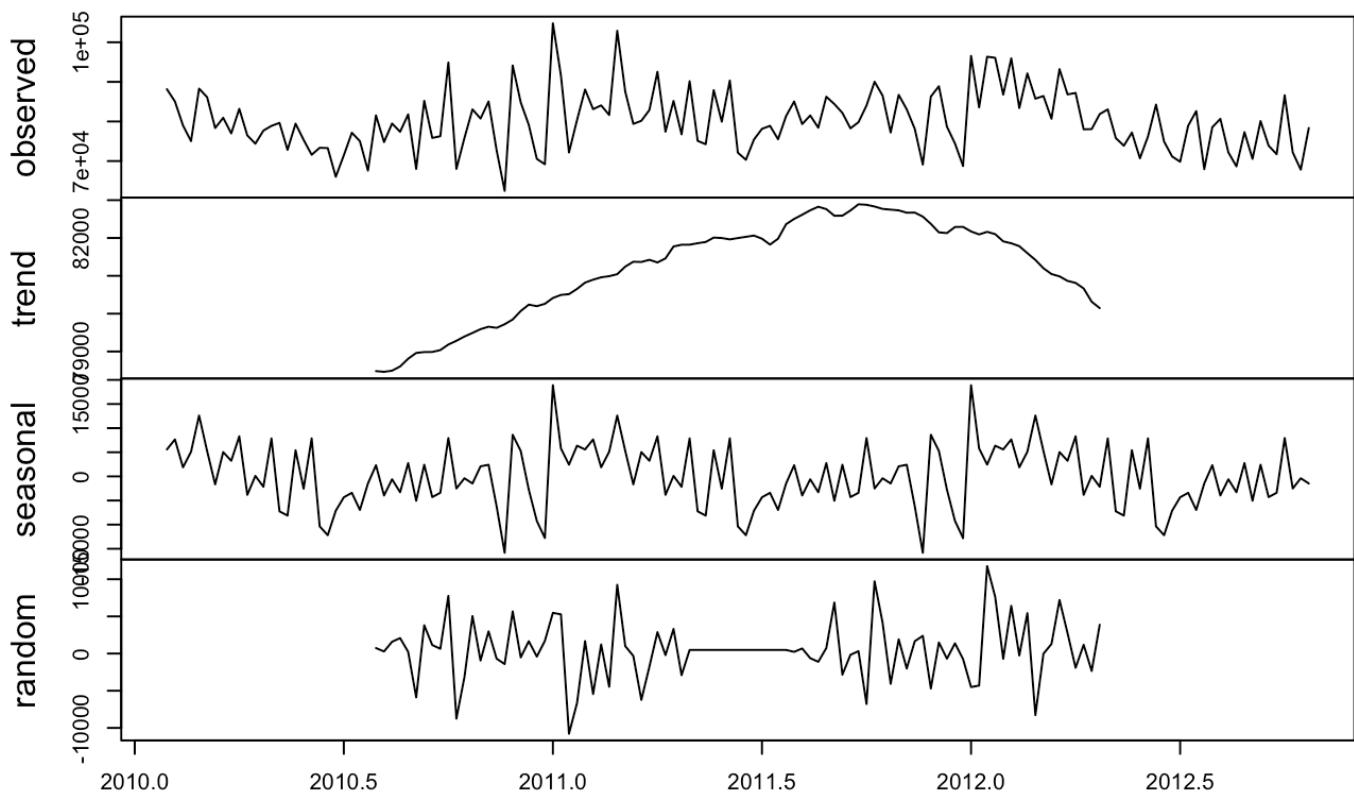
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

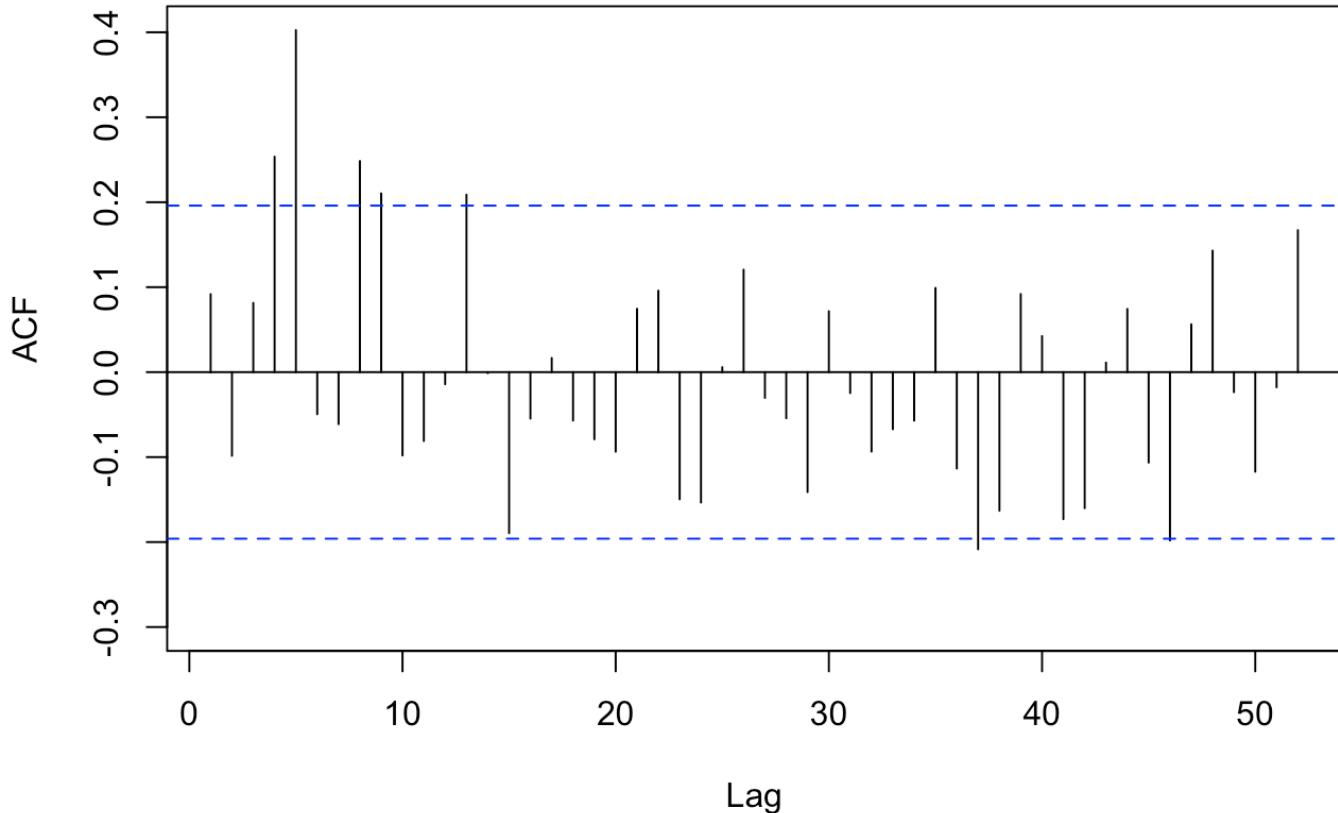
```
## [1] "Showing the results of store = 4 department = 38"
```



Decomposition of additive time series



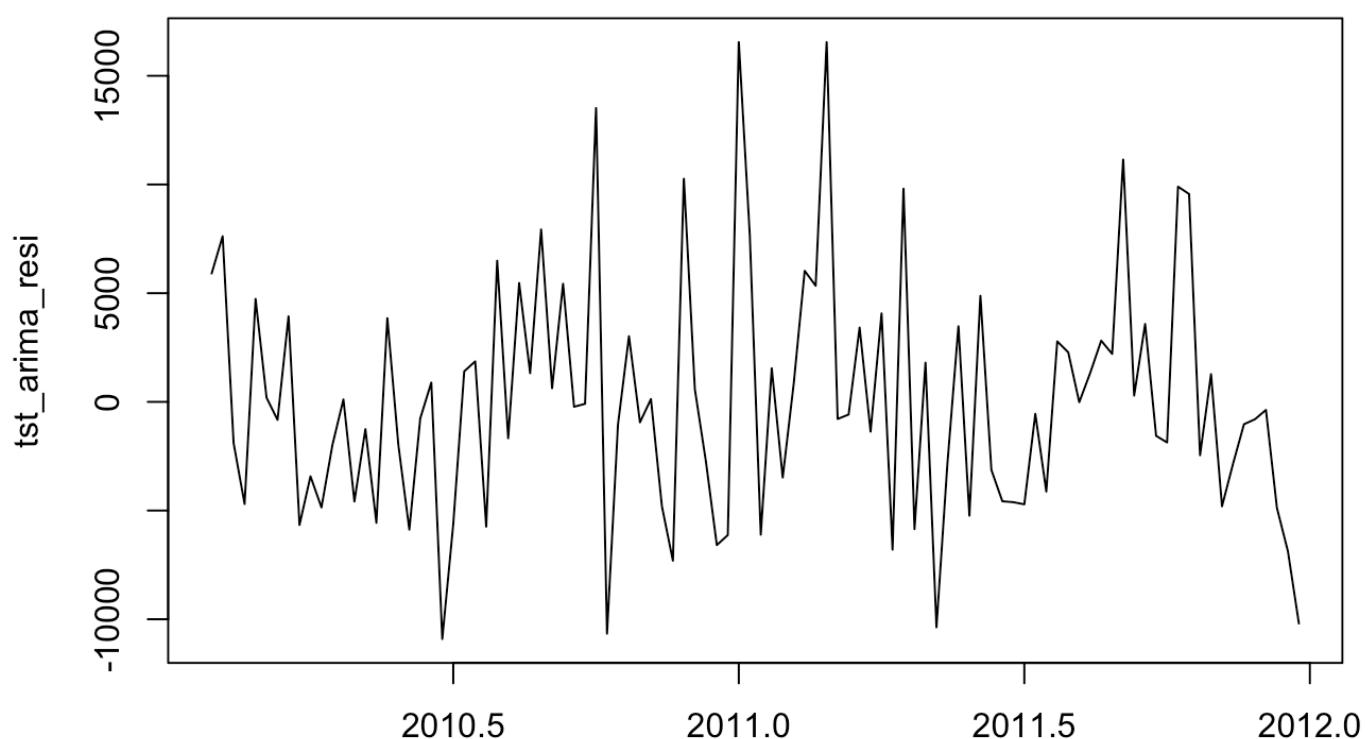
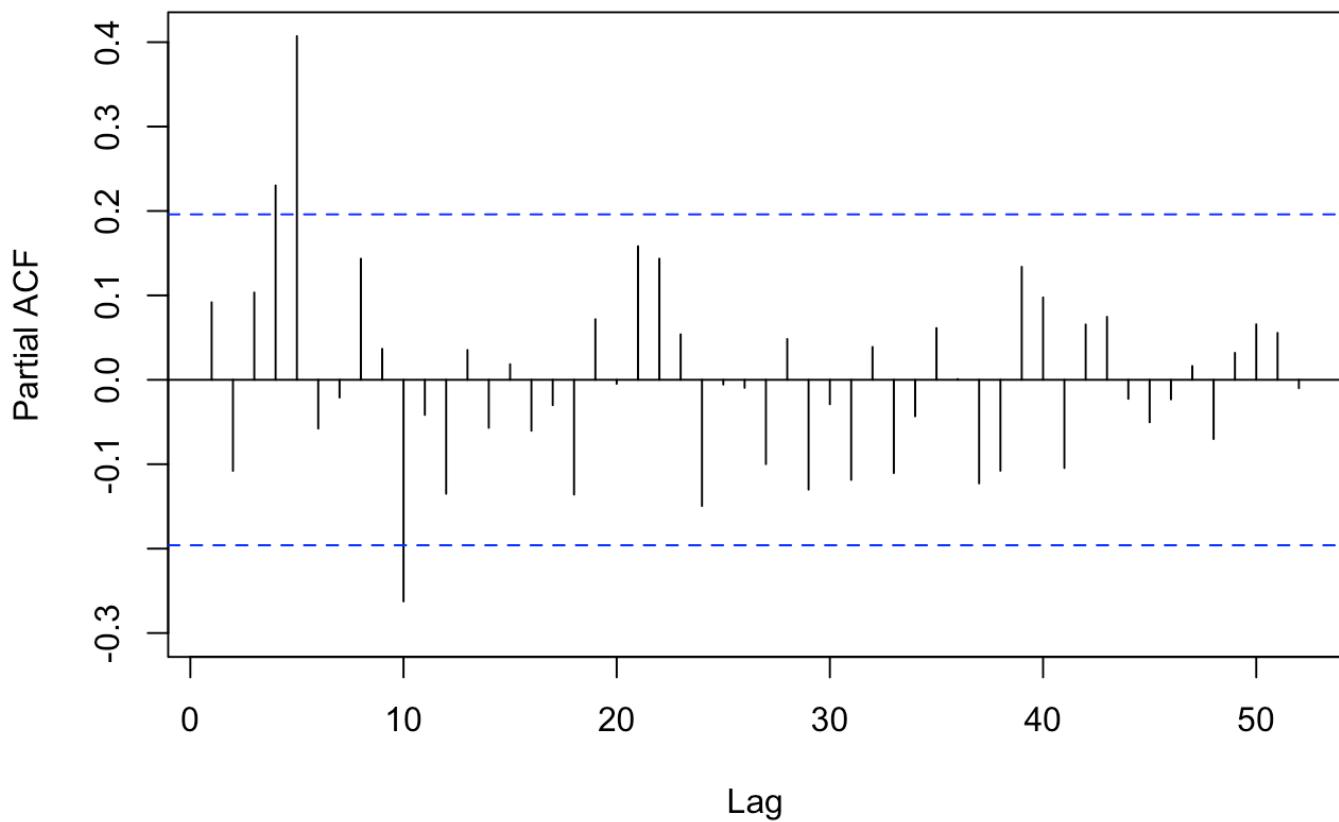
Time

Series train_sales

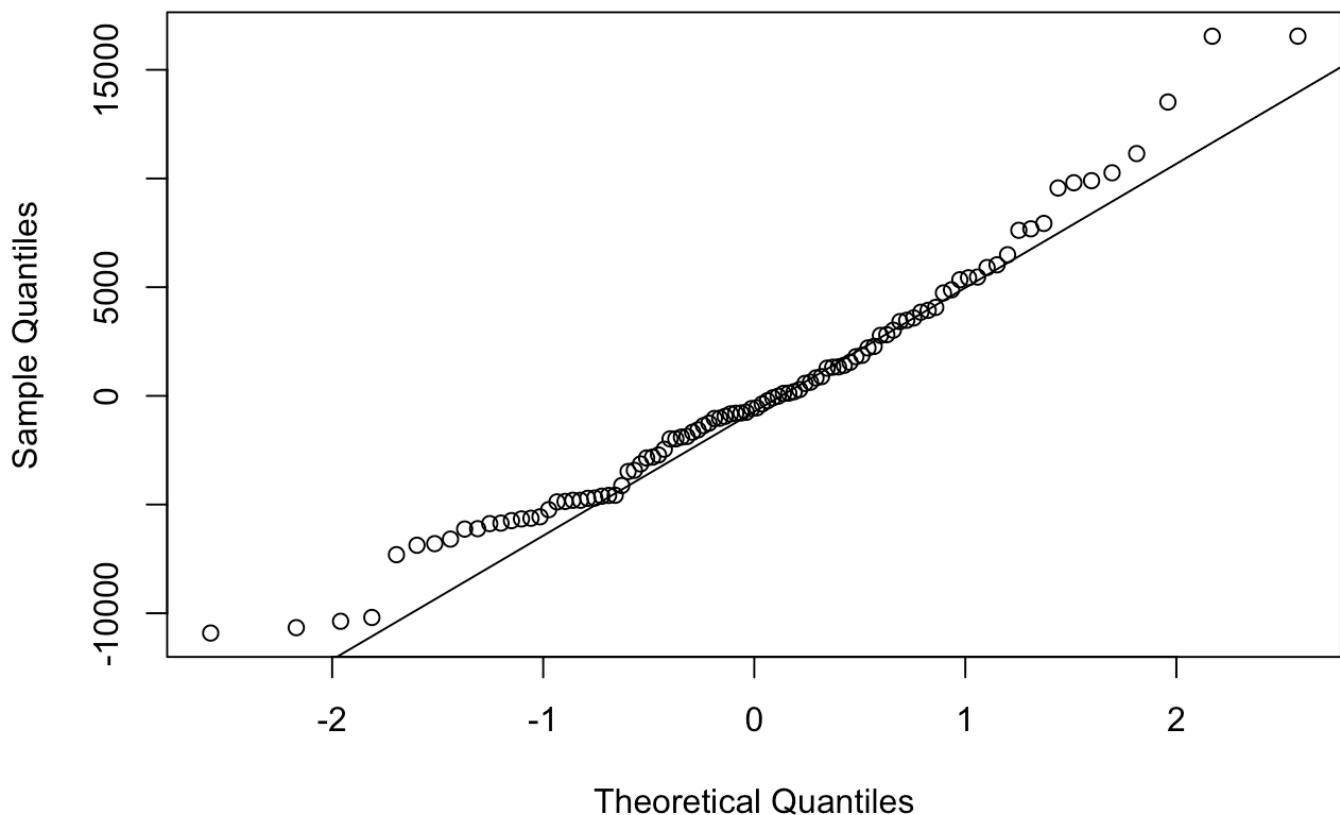
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

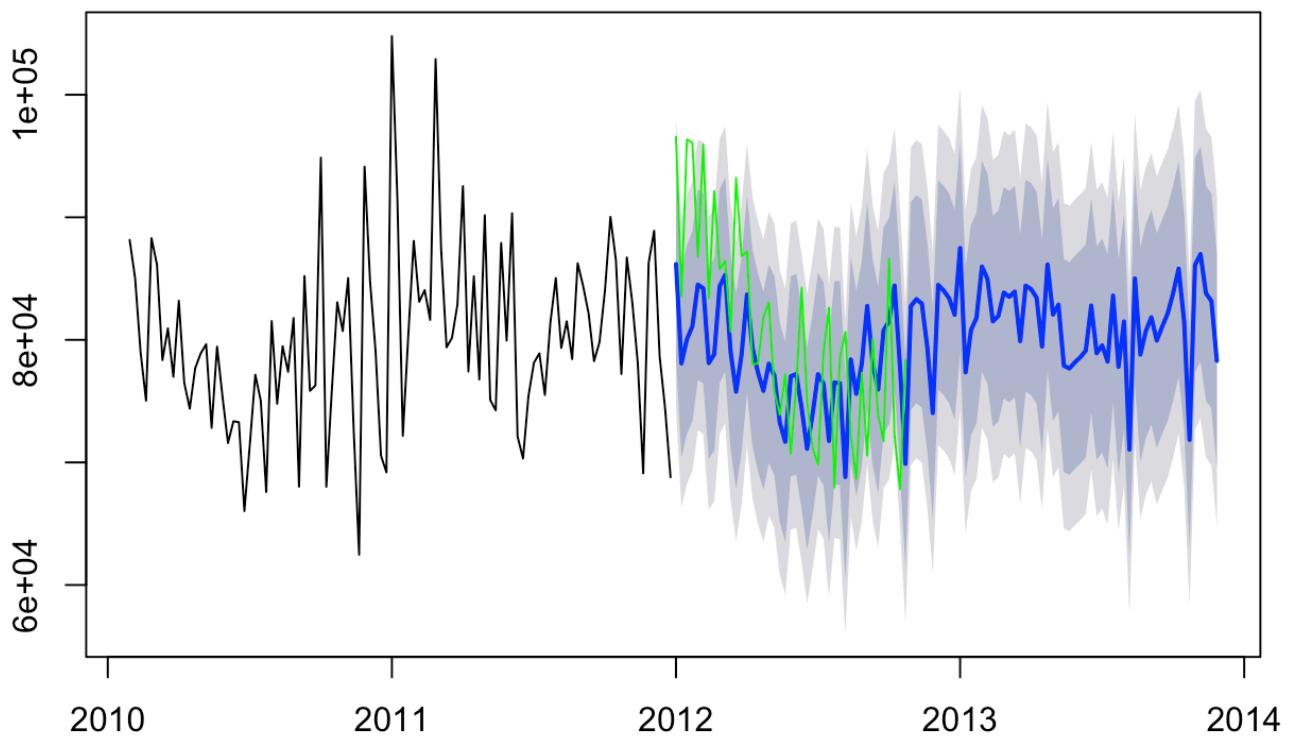

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



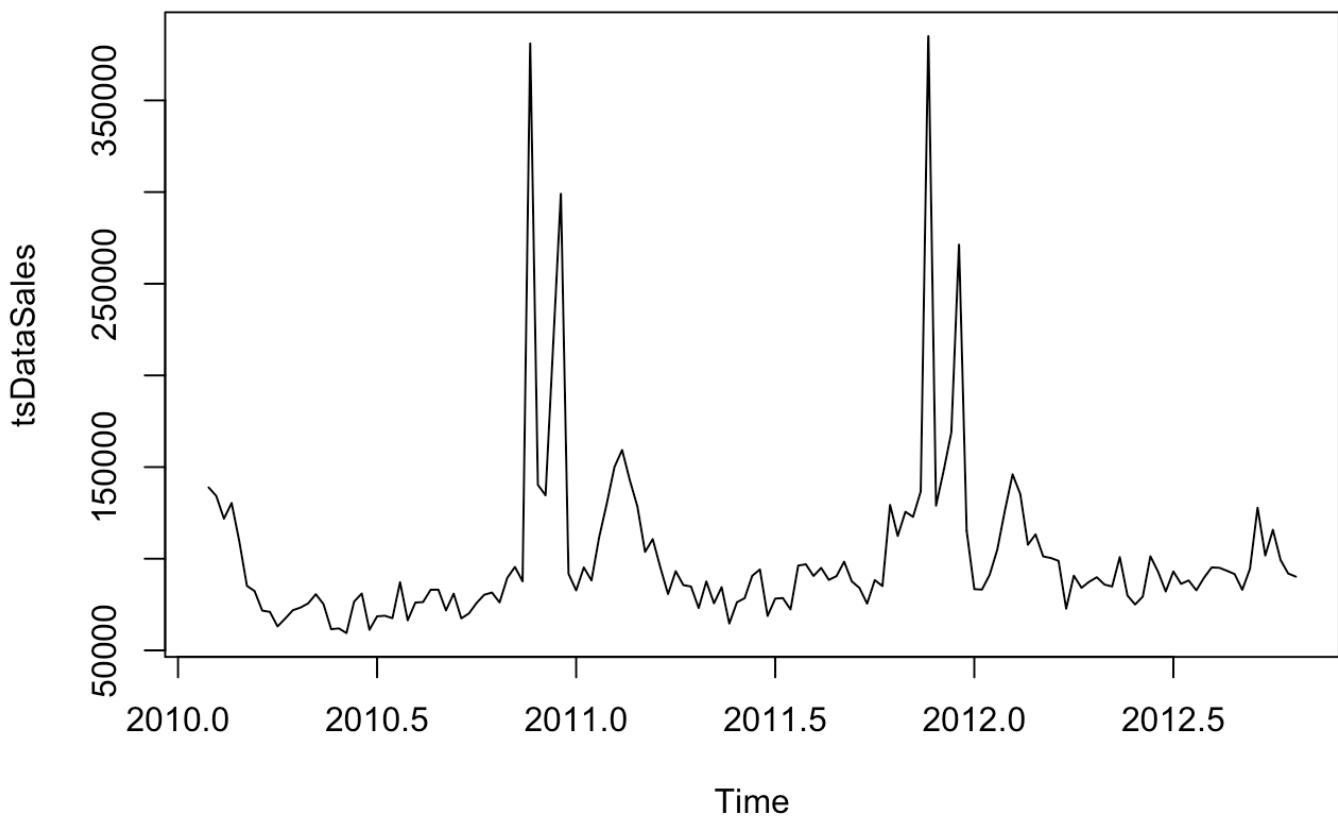
```

## [1] "8 out of 25 Completed"
## [1] "32 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 4 4 4 4 4 4 4 4 4 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept        : int 72 72 72 72 72 72 72 72 72 ...
## $ Weekly_Sales: num 138901 134199 121826 130404 109591 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int 205863 205863 205863 205863 205863 205863 205863 205863 205863 ...
## $ Temperature : num 43.8 28.8 36.5 41.4 43.5 ...
## $ Fuel_Price  : num 2.6 2.57 2.54 2.59 2.65 ...
## $ MarkDown1   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num NA NA NA NA NA NA NA NA NA ...
## $ CPI         : num 126 126 127 127 127 ...
## $ Unemployment: num 8.62 8.62 8.62 8.62 8.62 ...
##
## iter imp variable

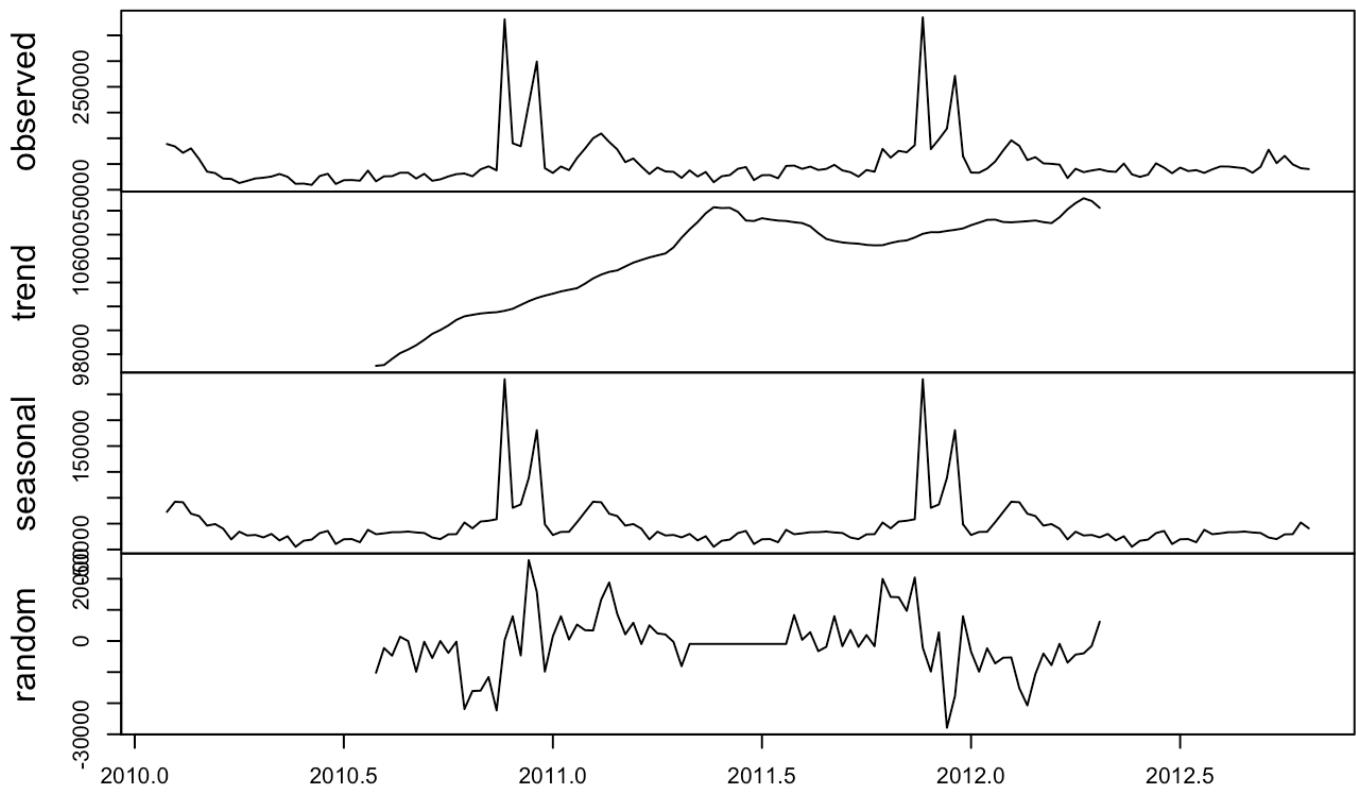
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

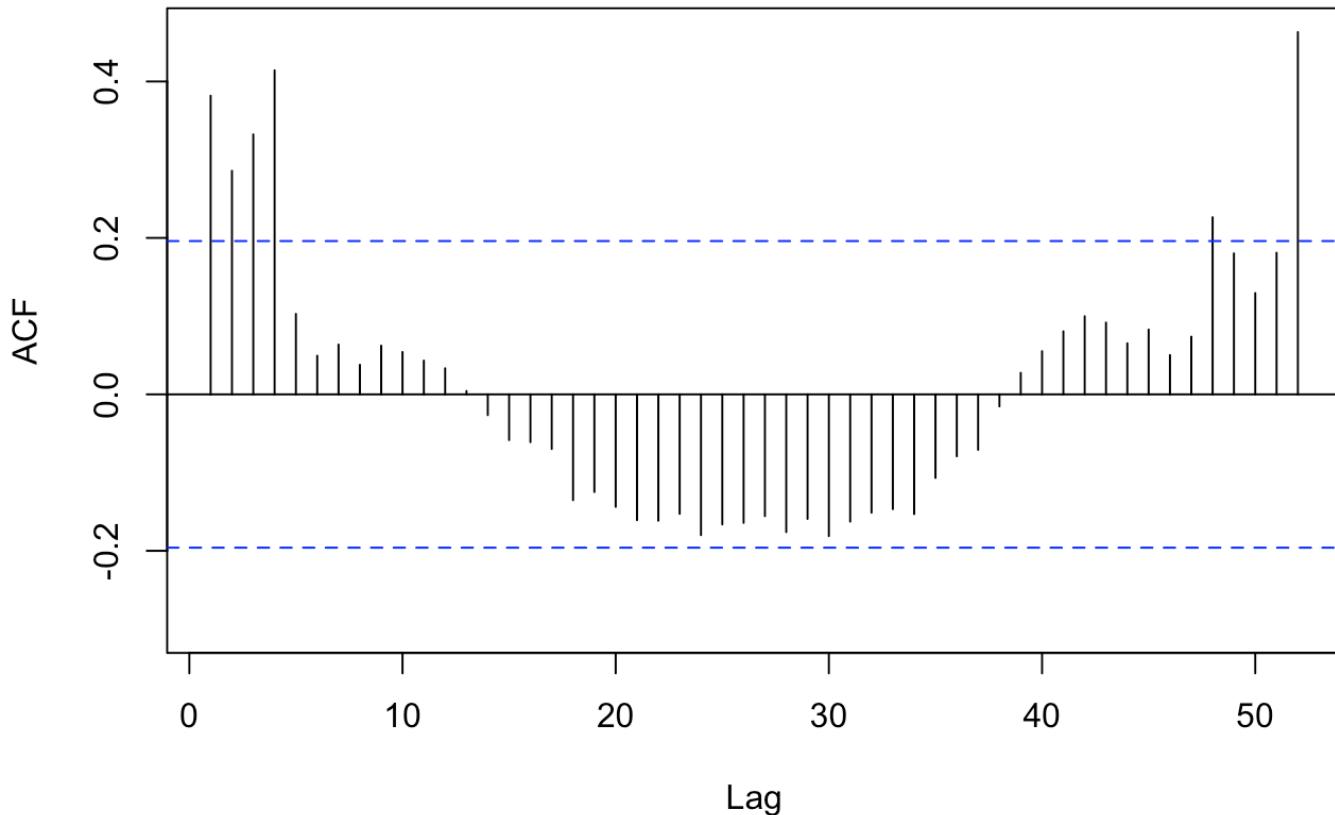
```
## [1] "Showing the results of store = 4 department = 72"
```



Decomposition of additive time series



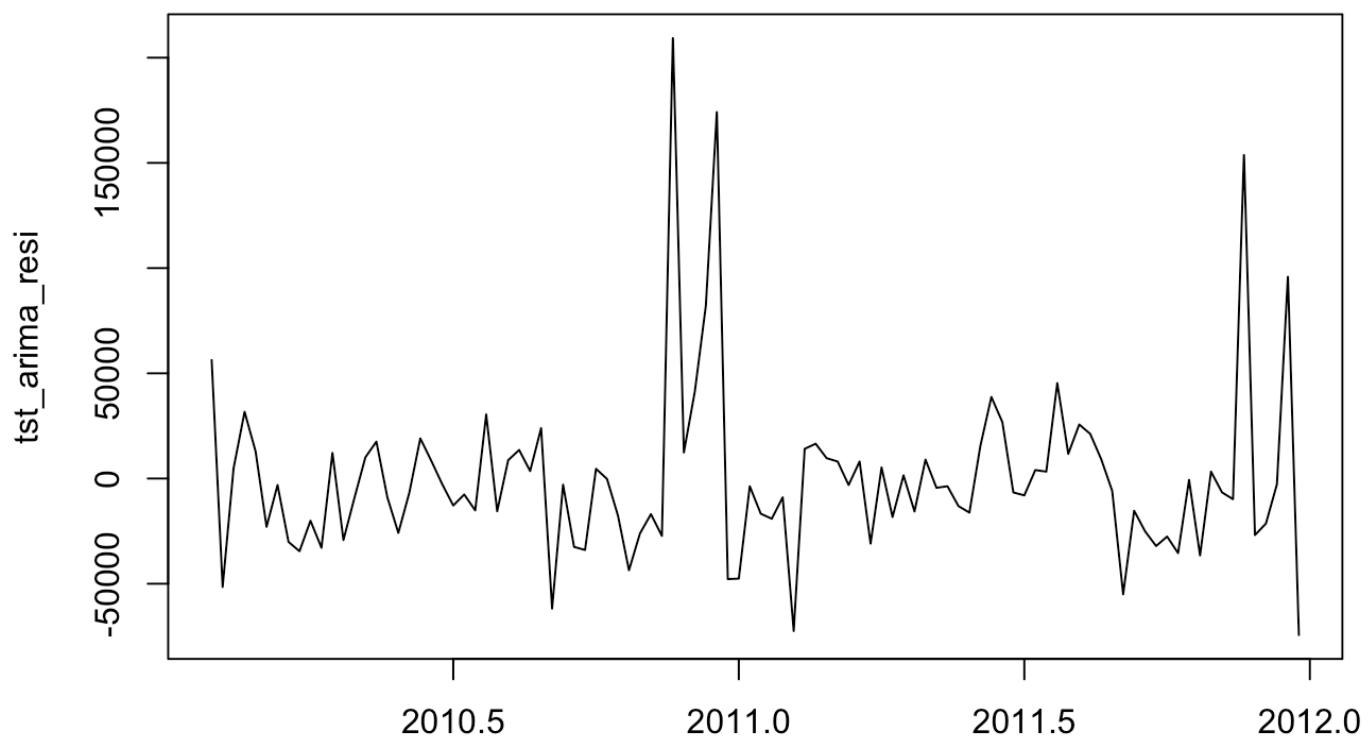
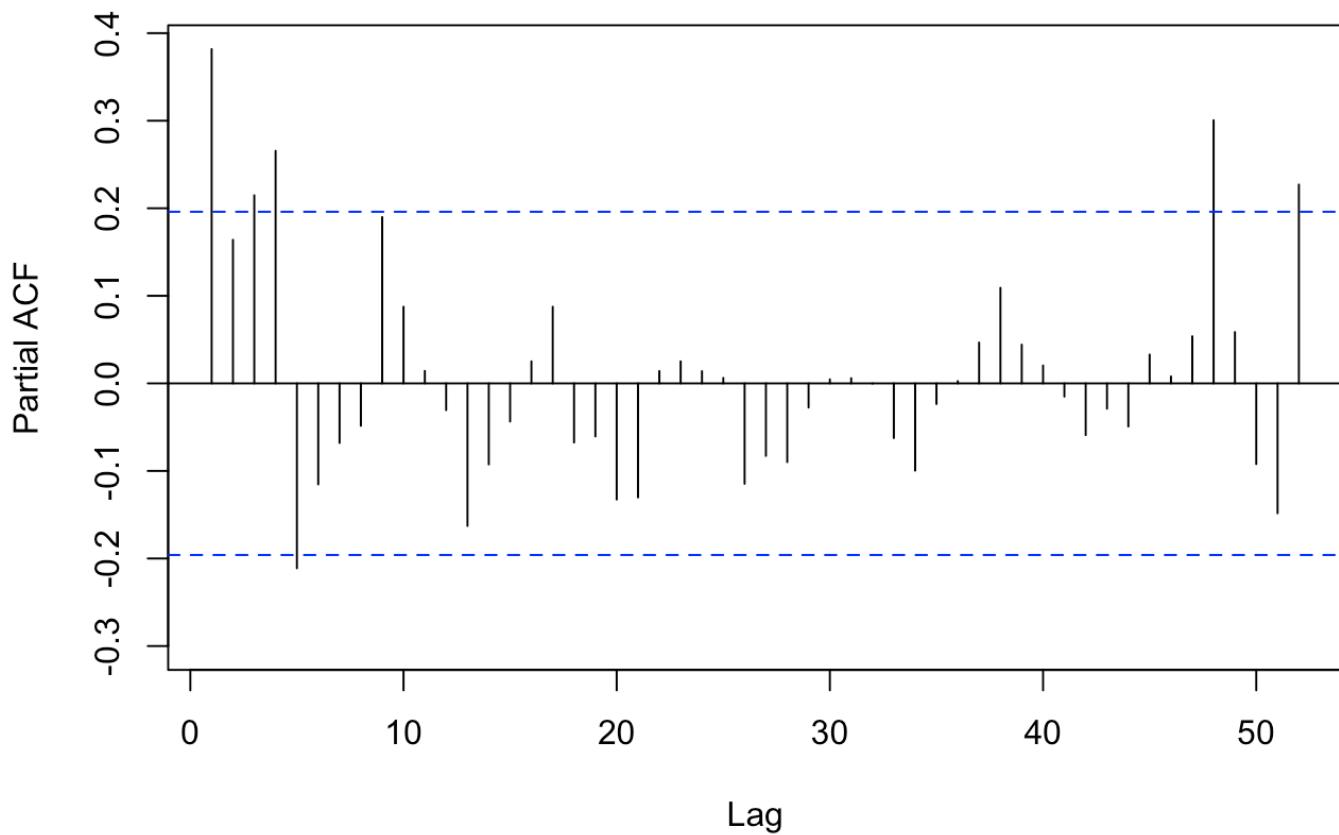
Time

Series train_sales

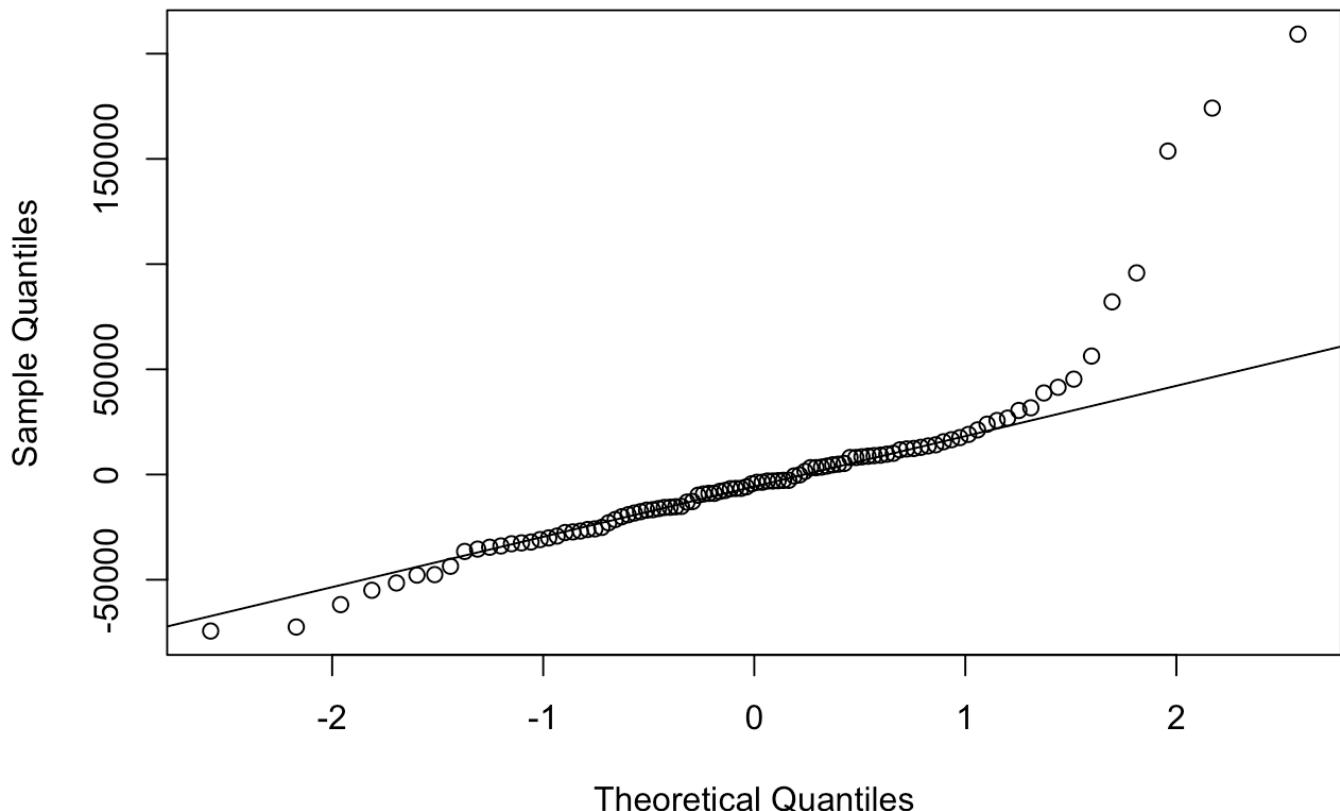
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

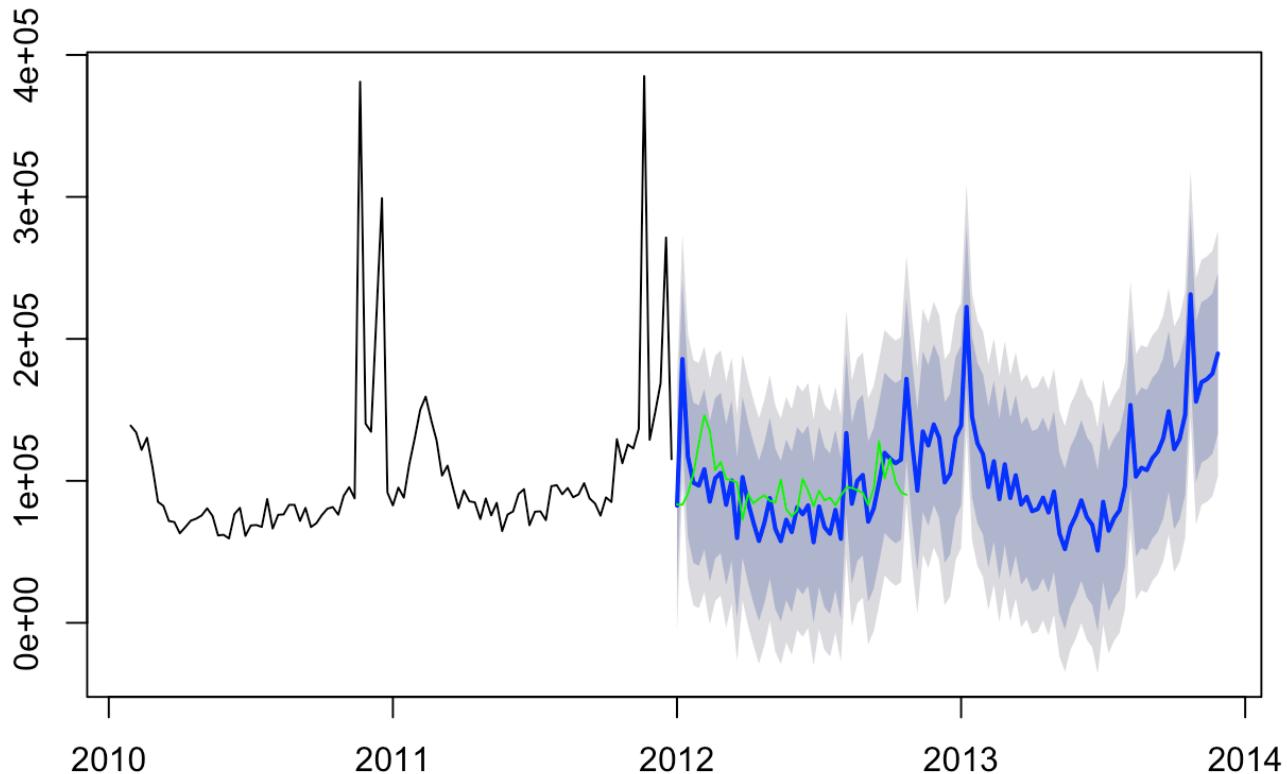

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



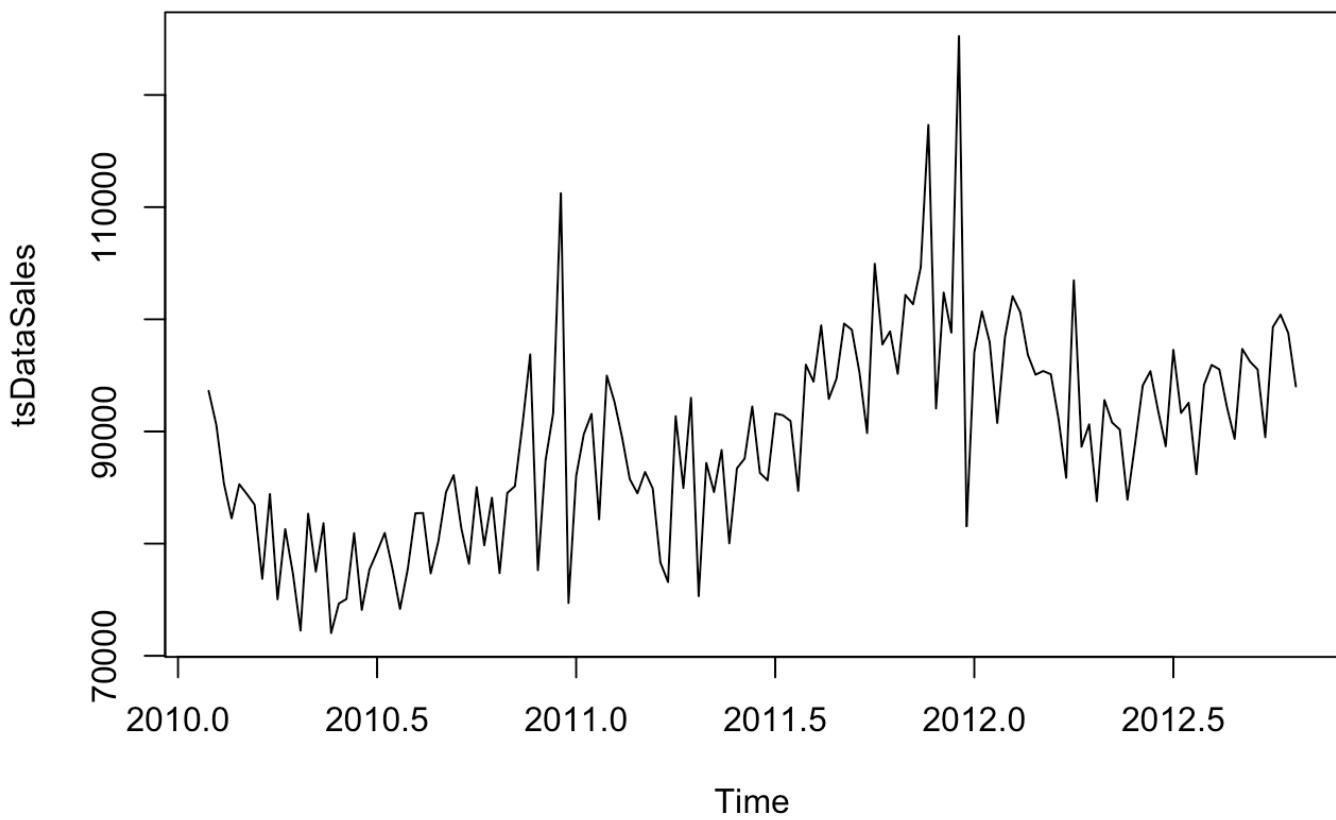
```

## [1] "9  out of  25  Completed"
## [1] "36 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  4 4 4 4 4 4 4 4 4 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
##   $ 8 9 10 ...
##   $ IsHoliday  : logi  FALSE TRUE FALSE FALSE FALSE FALSE ...
##   $ Dept       : int  90 90 90 90 90 90 90 90 90 ...
##   $ Weekly_Sales: num  93621 90587 85346 82258 85295 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  205863 205863 205863 205863 205863 205863 205863 205863 205863 ...
##   $ 05863 205863 ...
##   $ Temperature: num  43.8 28.8 36.5 41.4 43.5 ...
##   $ Fuel_Price  : num  2.6 2.57 2.54 2.59 2.65 ...
##   $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5   : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI         : num  126 126 127 127 127 ...
##   $ Unemployment: num  8.62 8.62 8.62 8.62 8.62 ...
## 
## 
##   iter imp variable

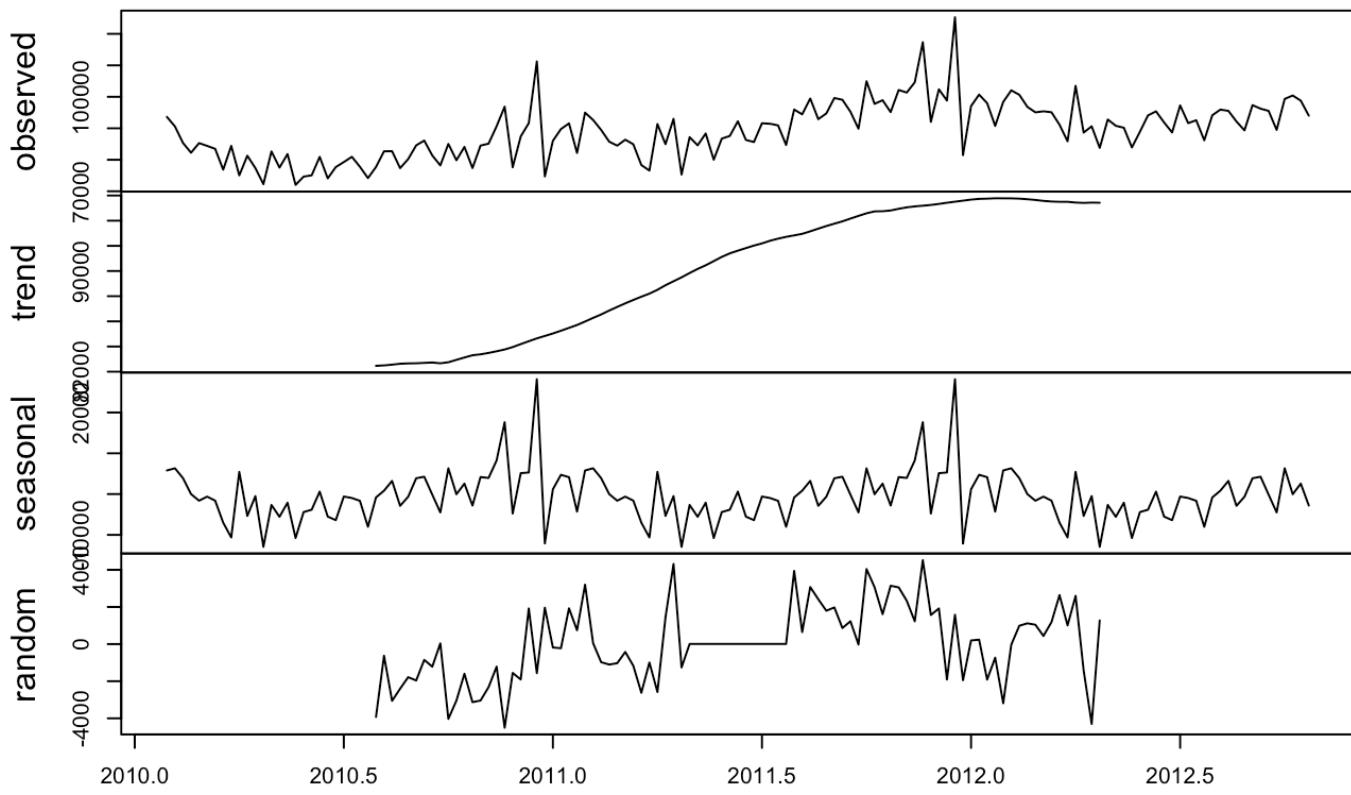
```

##	1	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	1	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	1	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	1	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	1	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	2	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	2	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	2	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	2	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	2	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	3	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	3	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	3	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	3	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	3	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	4	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	4	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	4	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	4	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	4	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	5	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	5	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	5	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	5	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	5	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	6	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	6	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	6	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	6	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	6	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	7	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	7	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	7	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	7	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	7	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	8	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	8	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	8	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	8	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	8	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	9	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	9	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	9	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	9	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	9	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	10	1	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	10	2	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	10	3	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	10	4	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5
##	10	5	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5

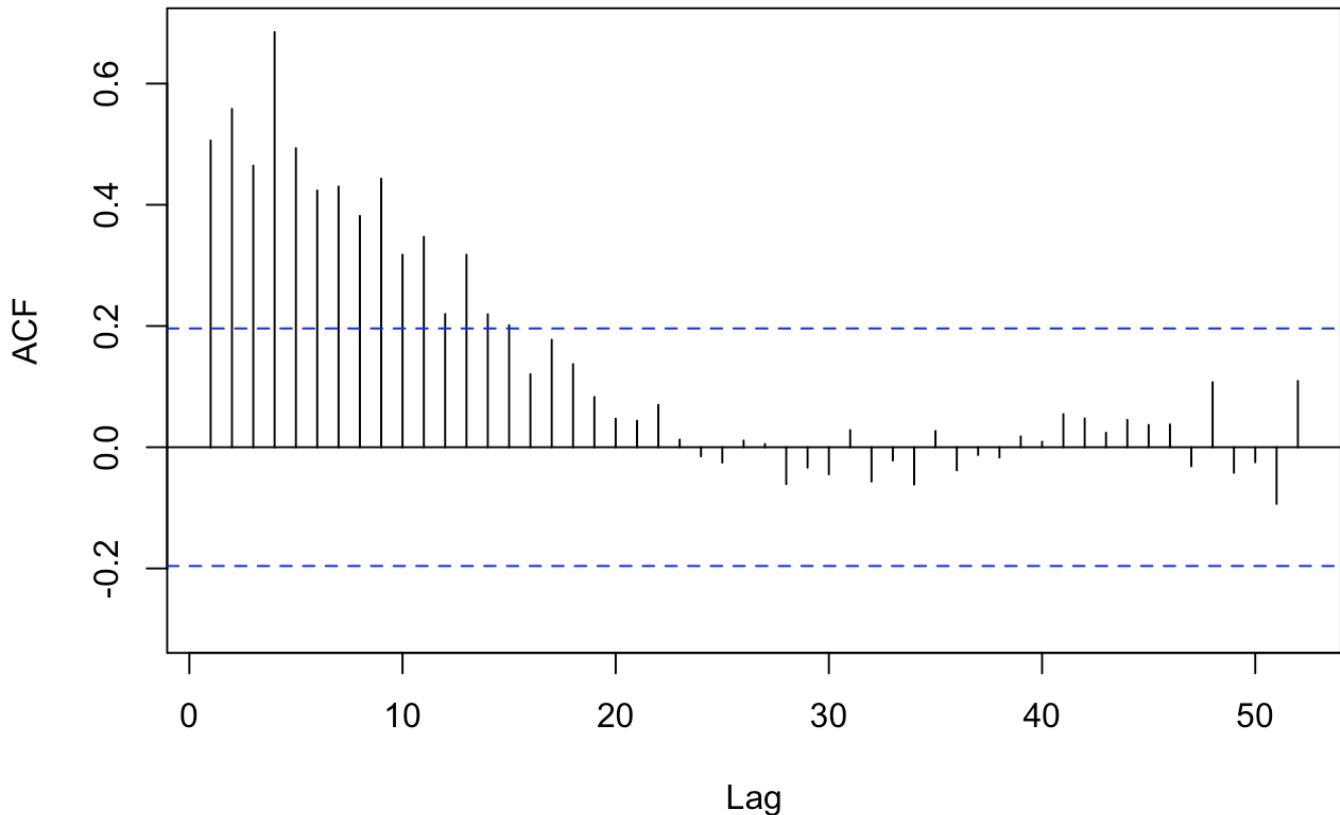
```
## [1] "Showing the results of store = 4 department = 90"
```



Decomposition of additive time series



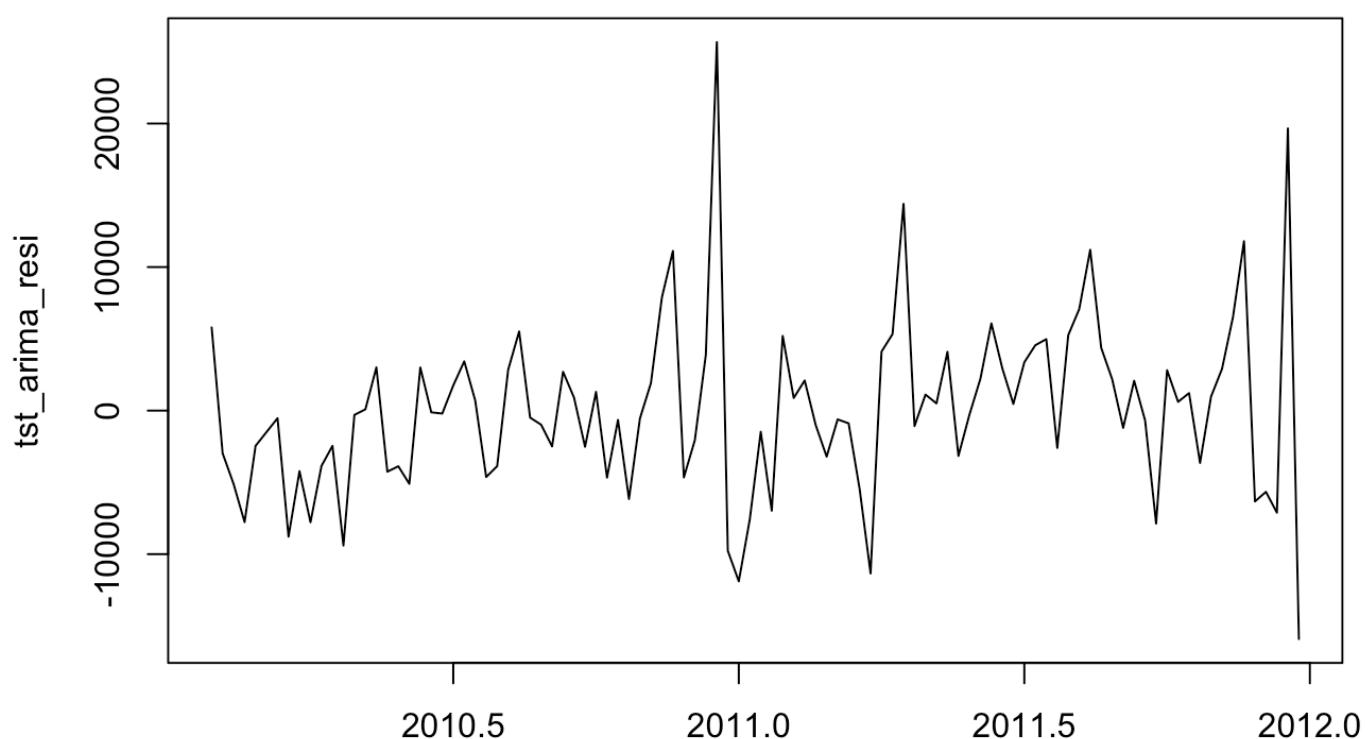
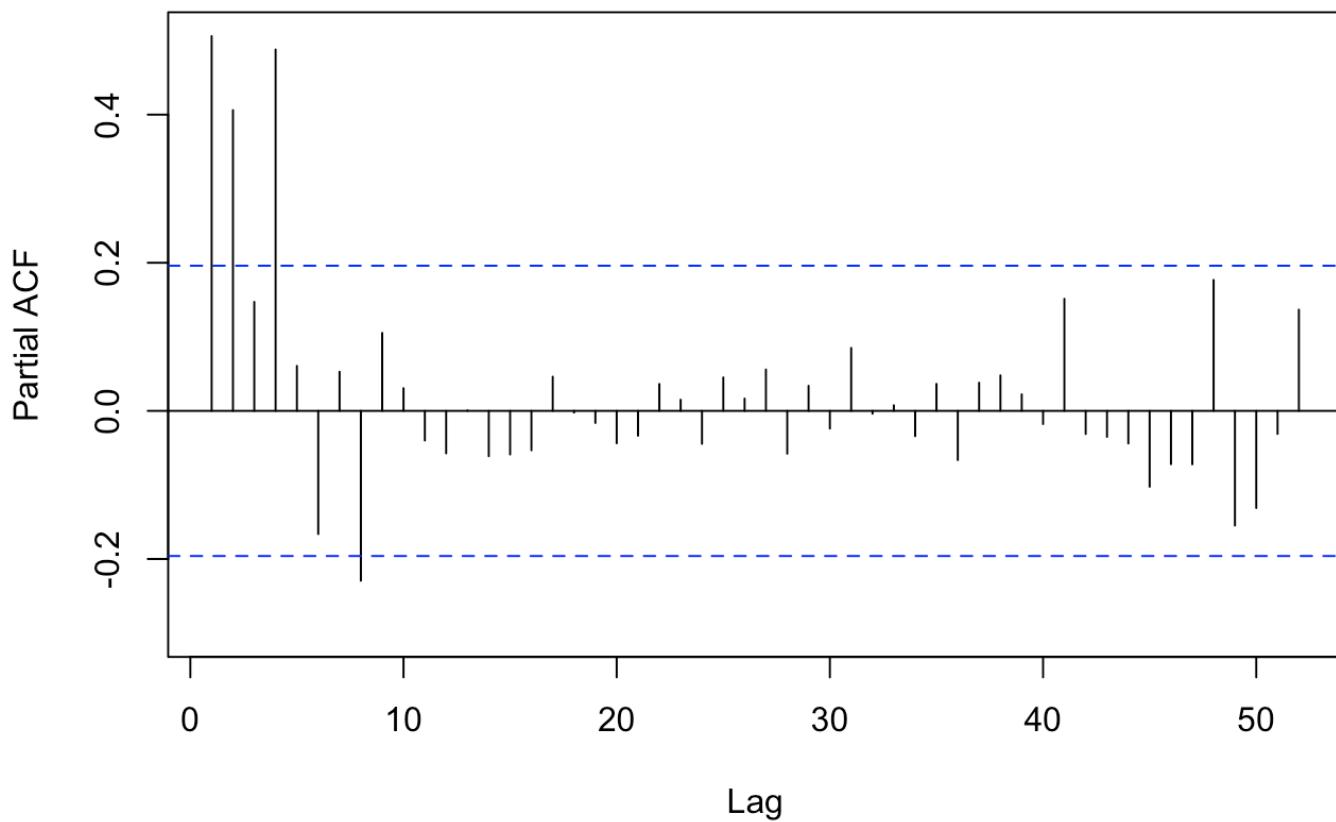
Time

Series train_sales

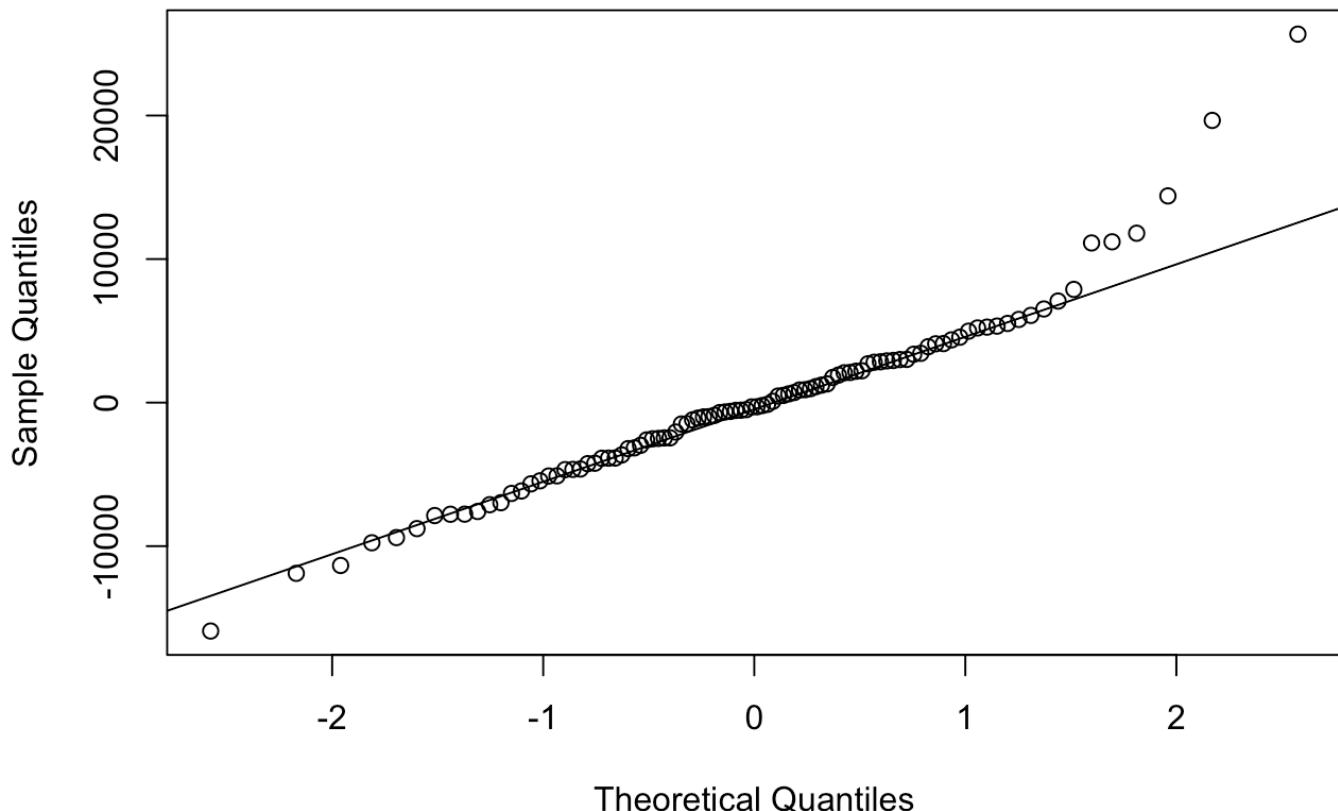
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

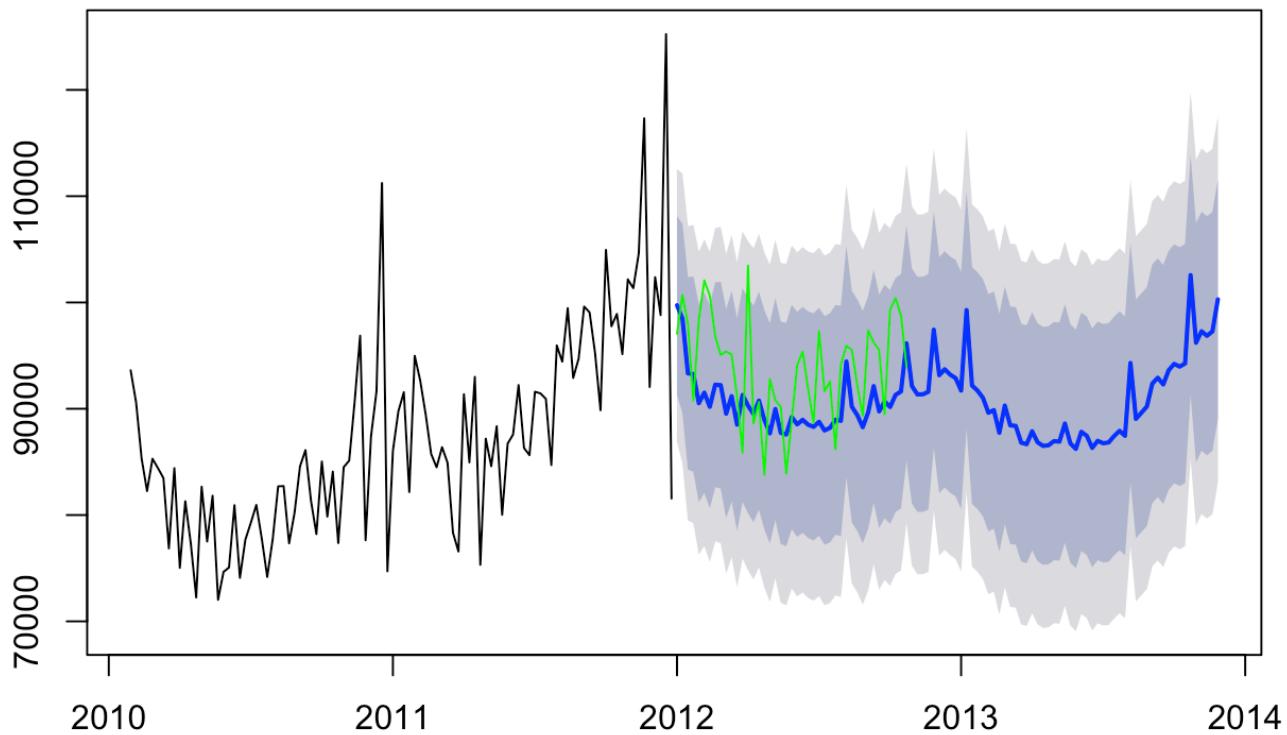

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



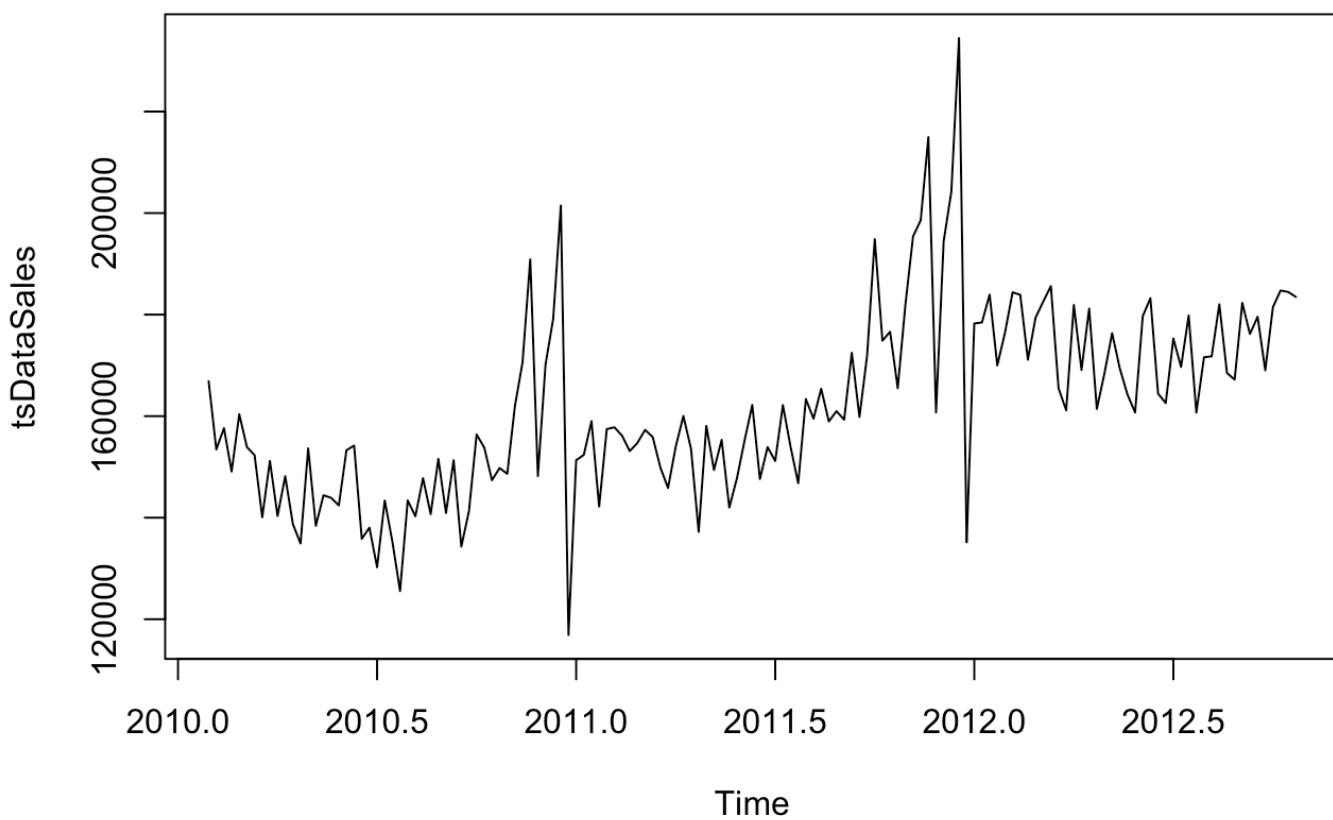
```

## [1] "10  out of  25  Completed"
## [1] "40 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  13 13 13 13 13 13 13 13 13 13 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  166872 153435 157625 149089 160383 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  219622 219622 219622 219622 219622 219622 219622 219622 ...
##   $ Temperature: num  31.5 33.2 35.7 30 40.6 ...
##   $ Fuel_Price  : num  2.67 2.67 2.65 2.67 2.68 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  126 126 127 127 127 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
##
## 
## iter imp variable

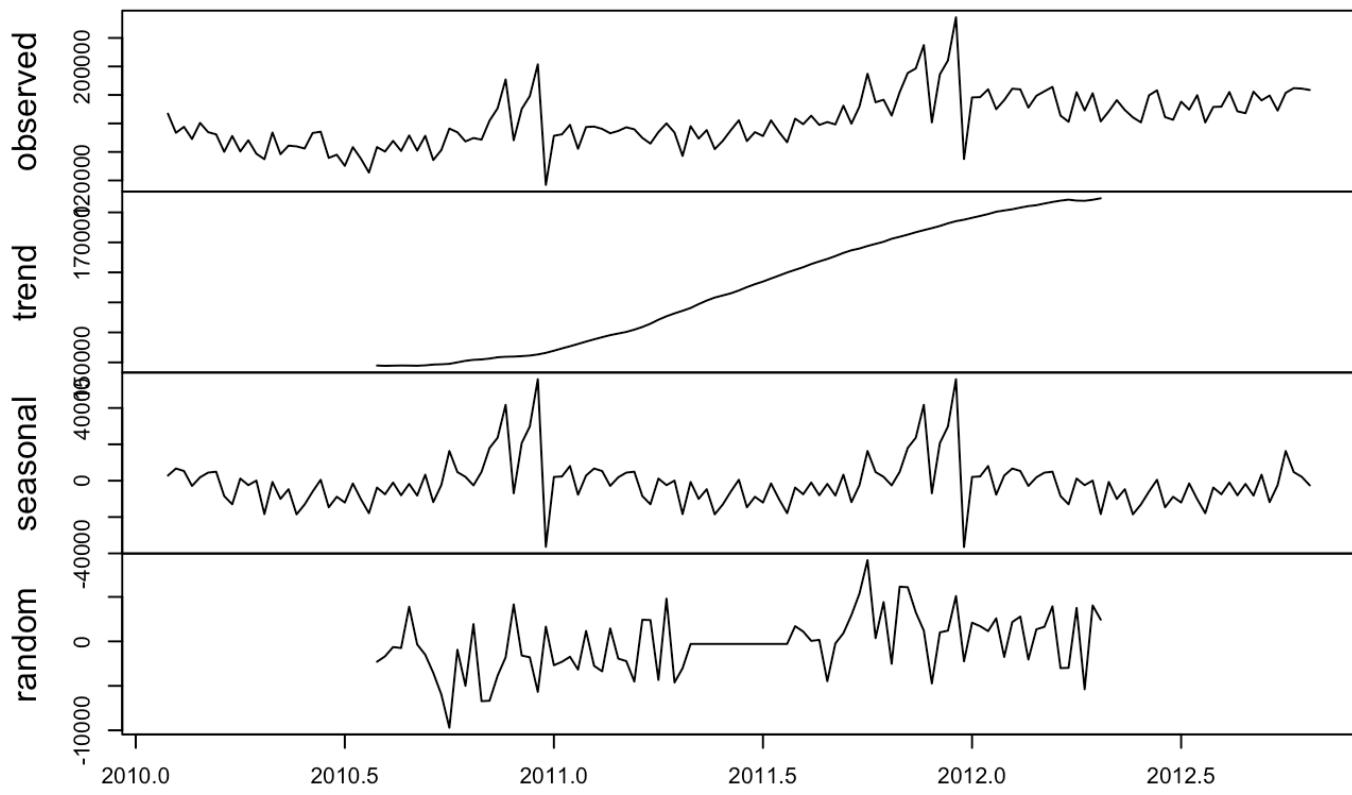
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

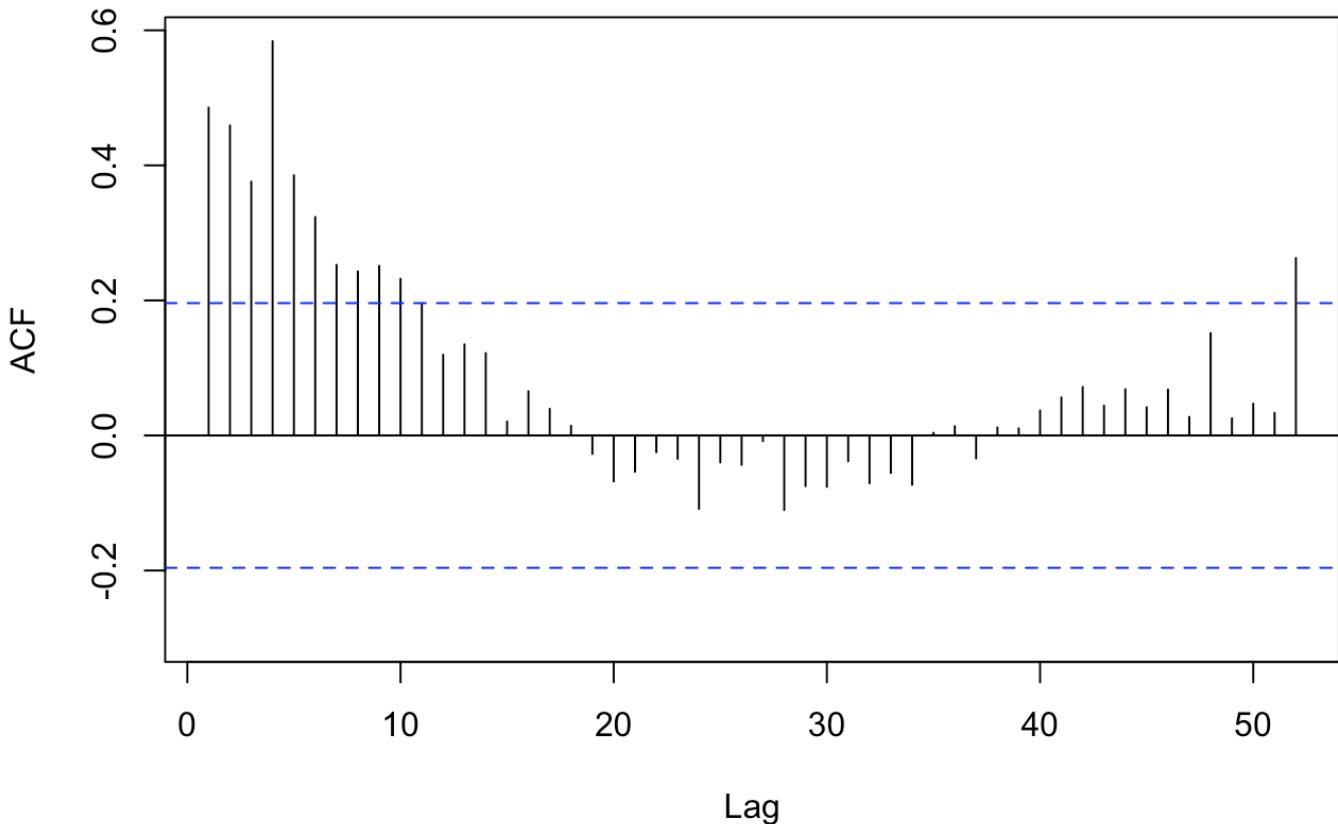
```
## [1] "Showing the results of store = 13 department = 92"
```



Decomposition of additive time series



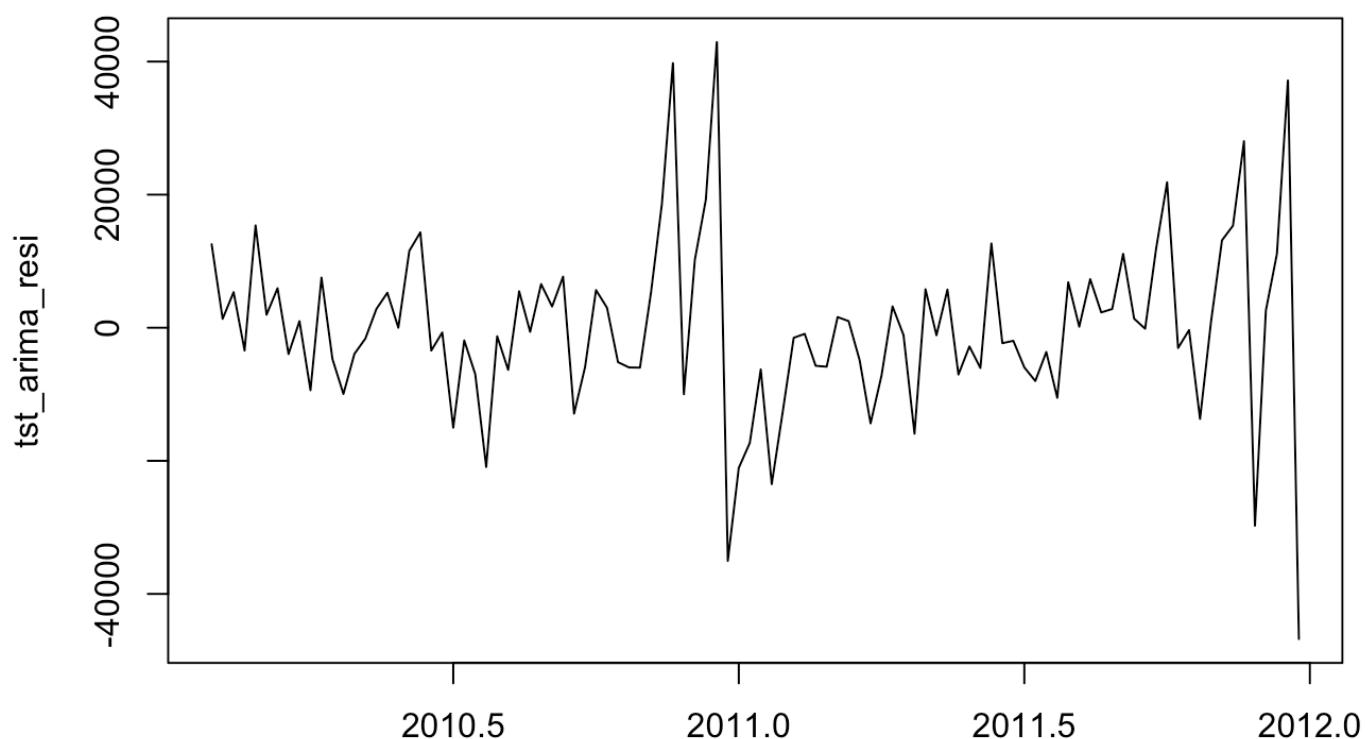
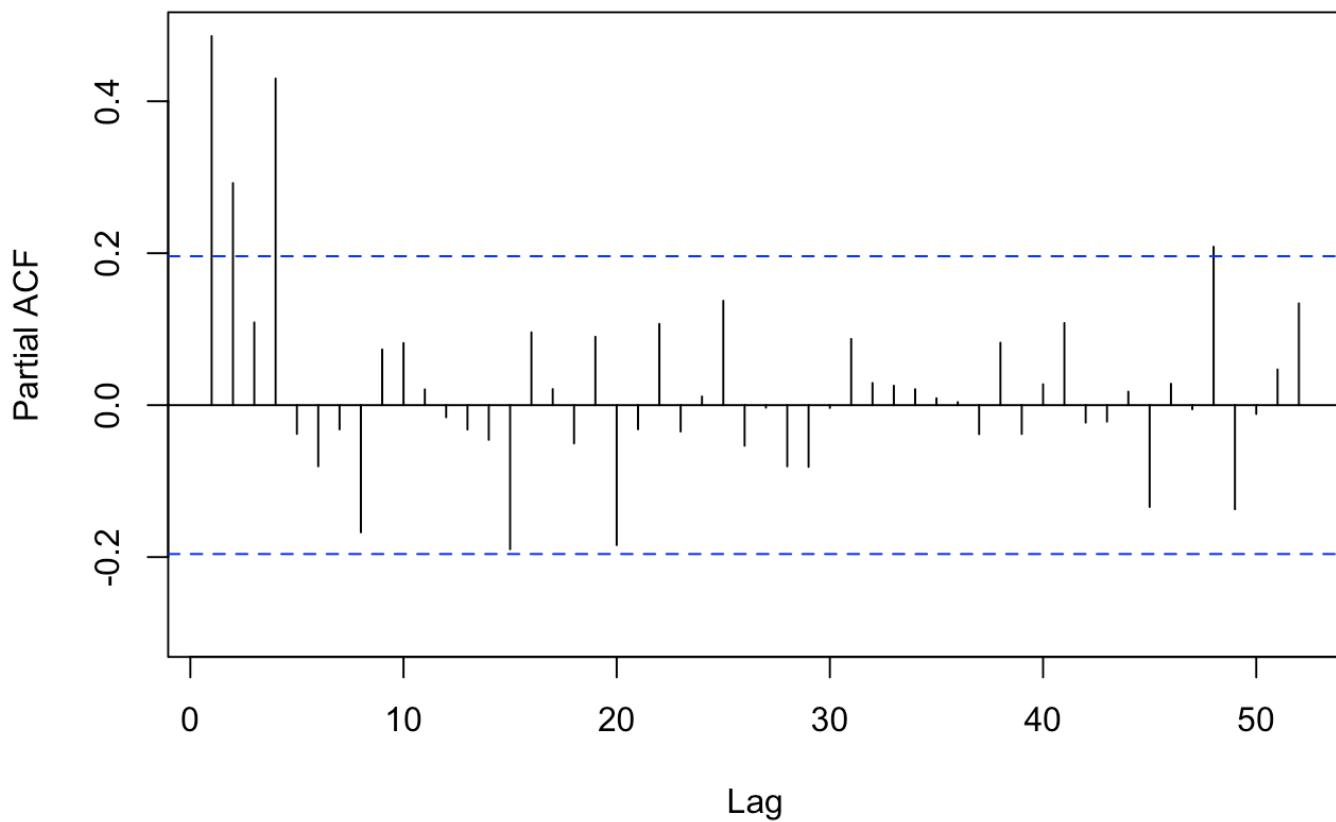
Time

Series train_sales

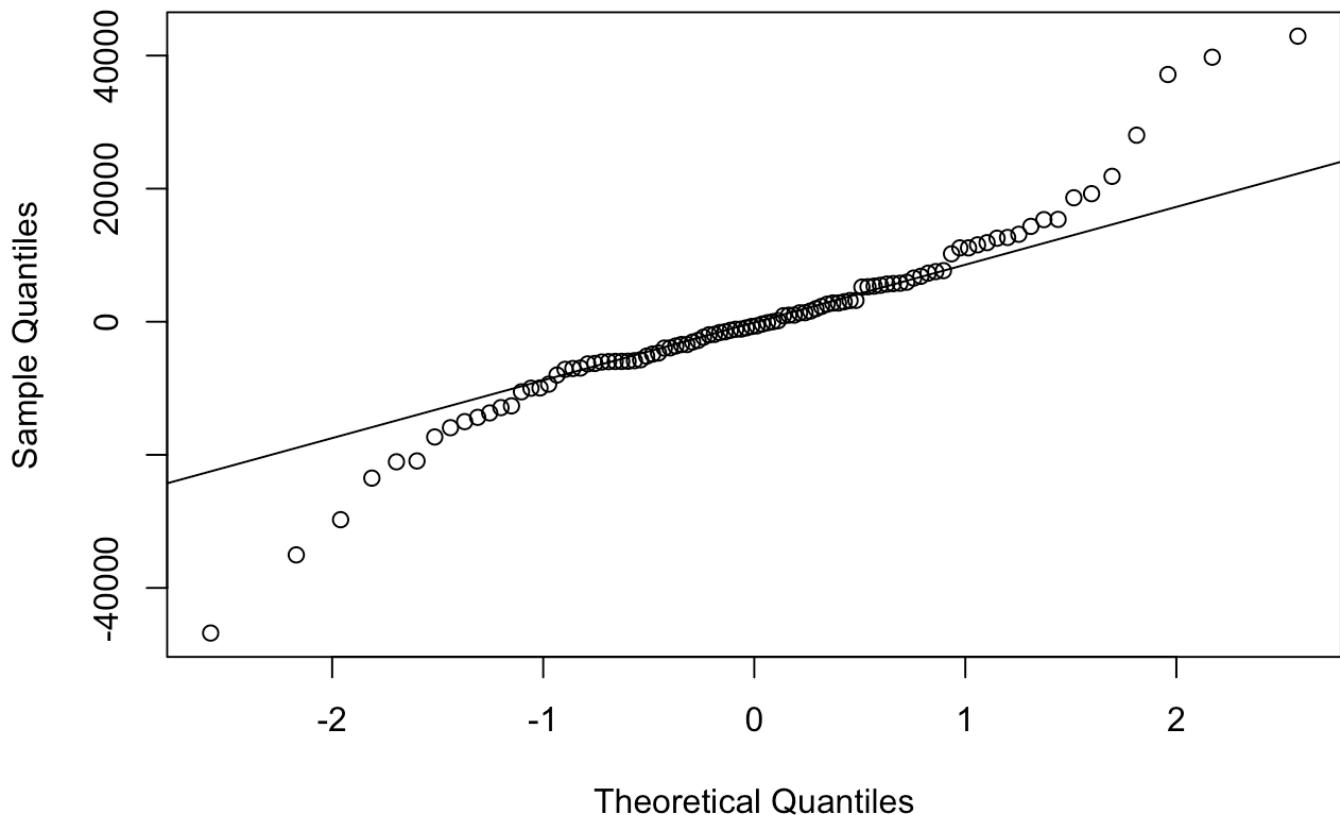
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

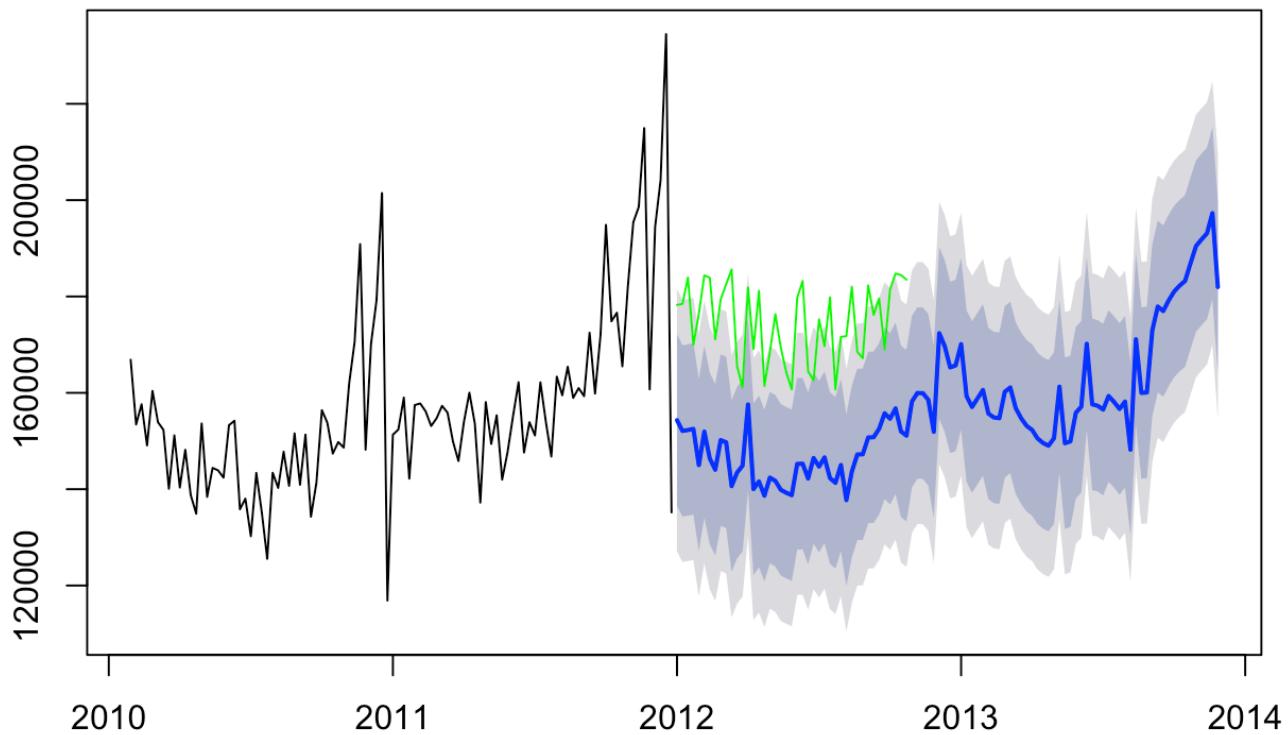

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



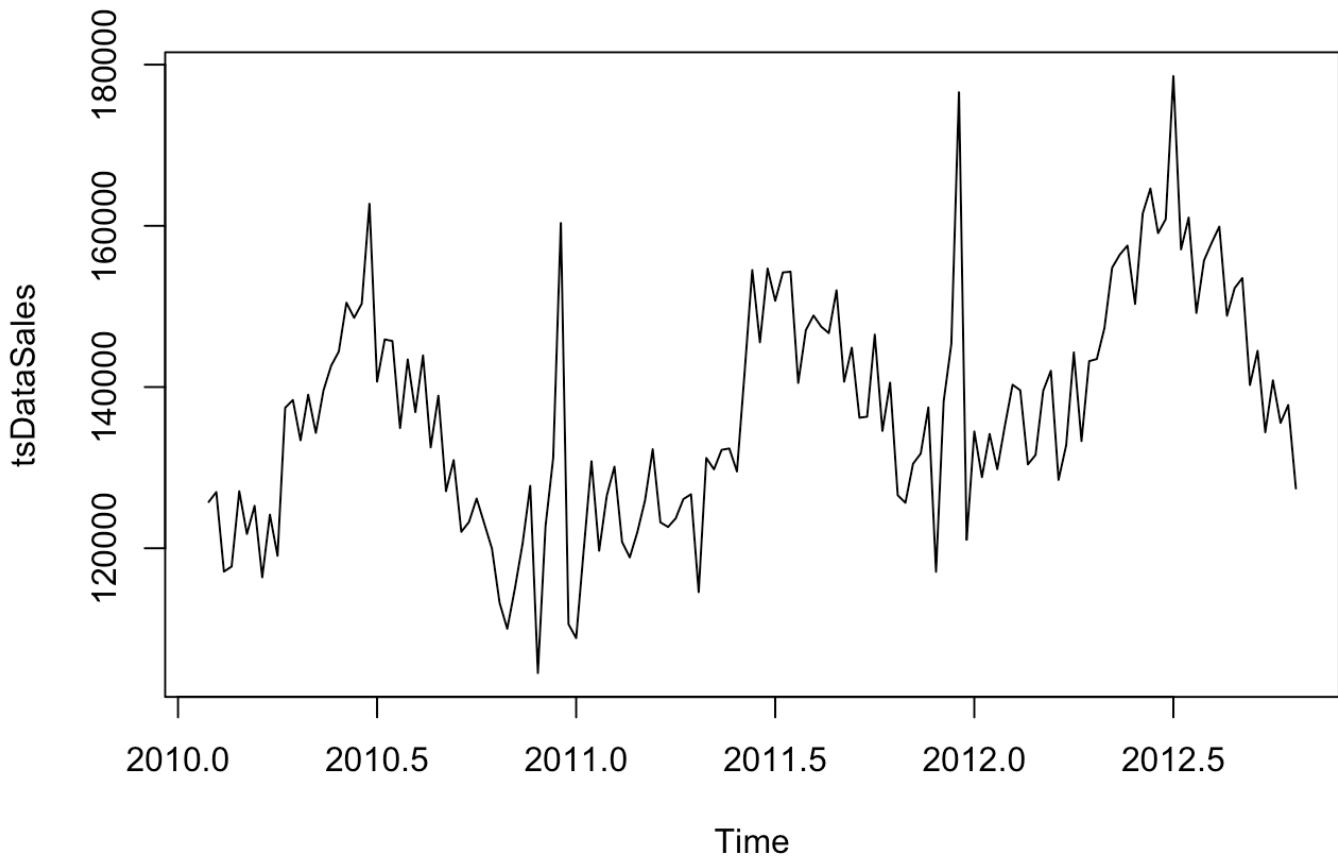
```

## [1] "11  out of  25  Completed"
## [1] "44 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  13 13 13 13 13 13 13 13 13 13 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  125740 126970 117104 117729 127071 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  219622 219622 219622 219622 219622 219622 219622 219622 ...
##   $ Temperature: num  31.5 33.2 35.7 30 40.6 ...
##   $ Fuel_Price  : num  2.67 2.67 2.65 2.67 2.68 ...
##   $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5   : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI         : num  126 126 127 127 127 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
##
## 
## iter imp variable

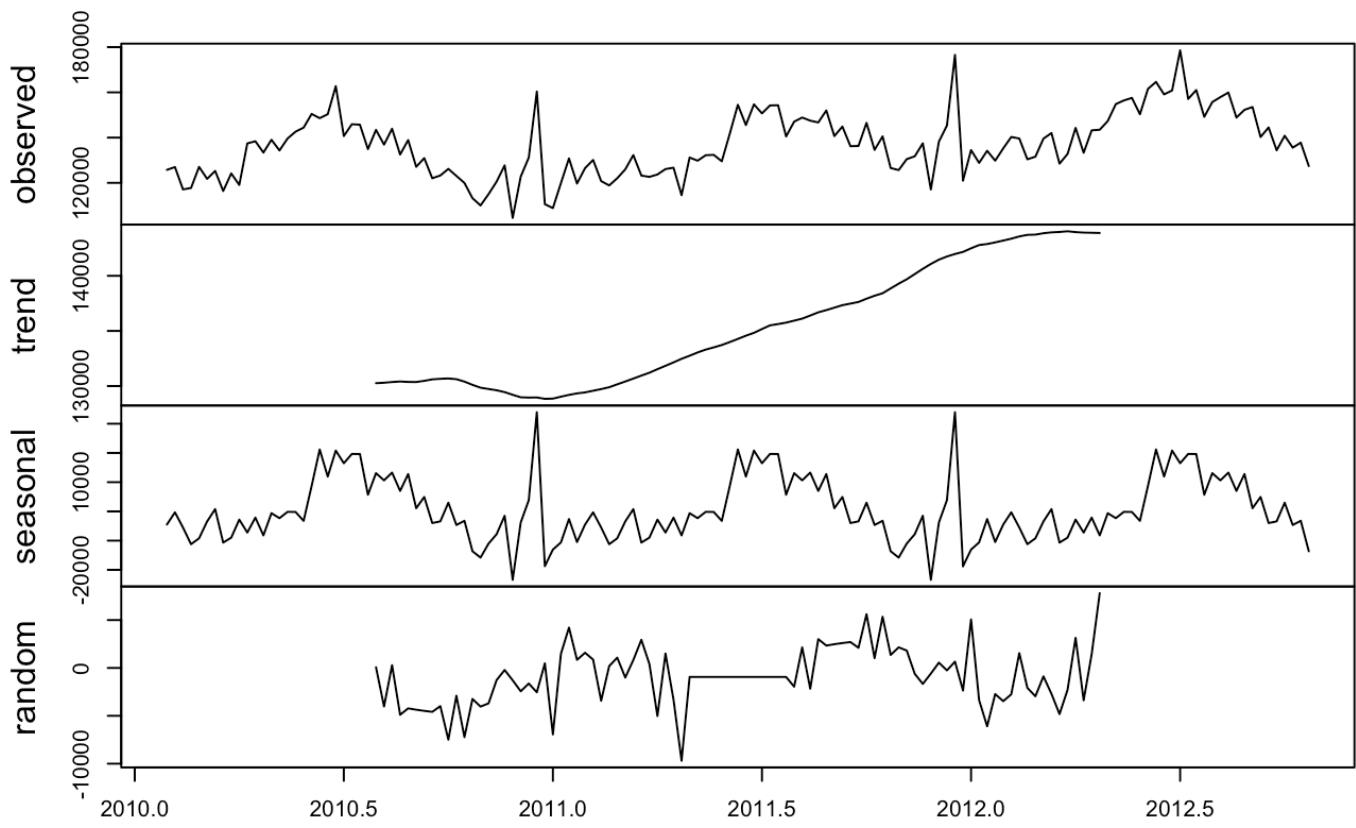
```

```
## 1 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
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## 4 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
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## 7 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
```

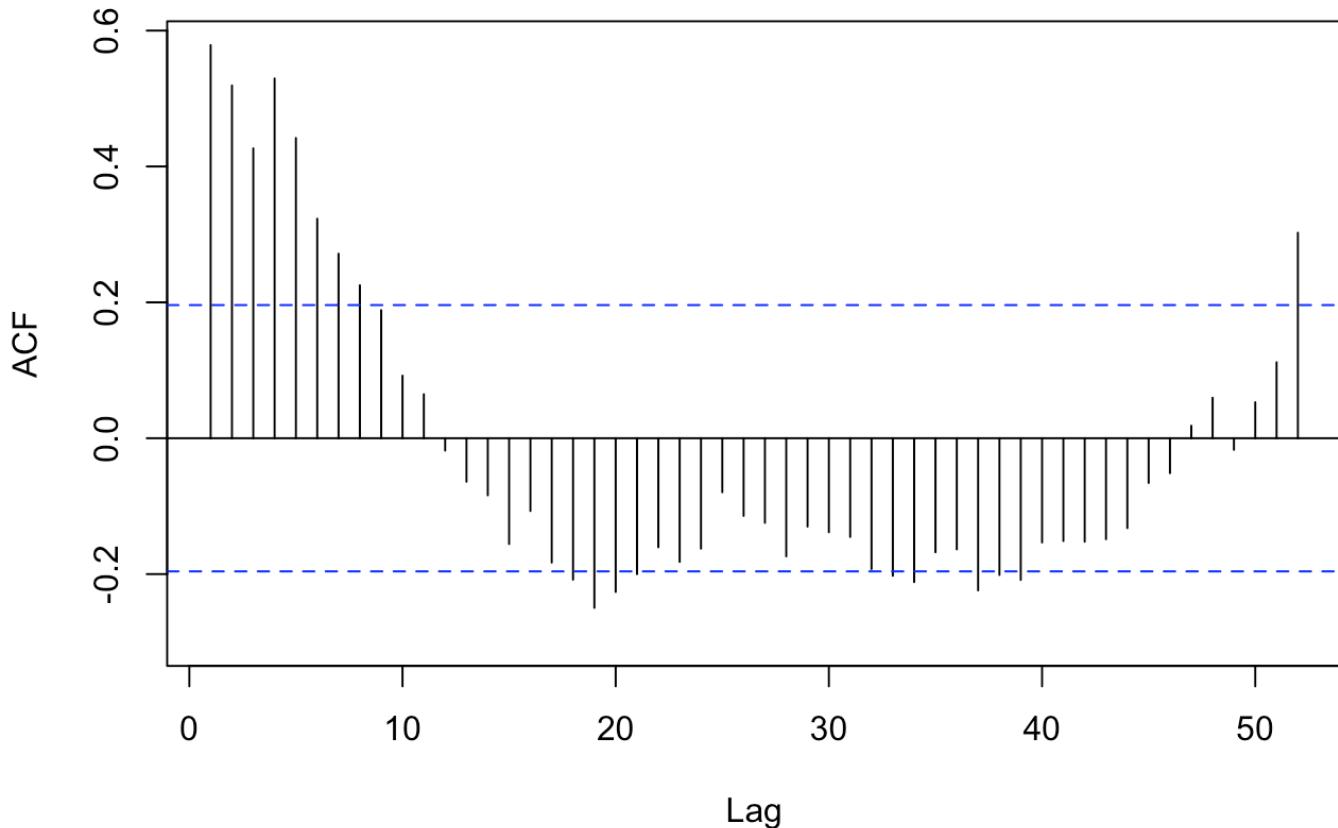
```
## [1] "Showing the results of store = 13 department = 95"
```



Decomposition of additive time series



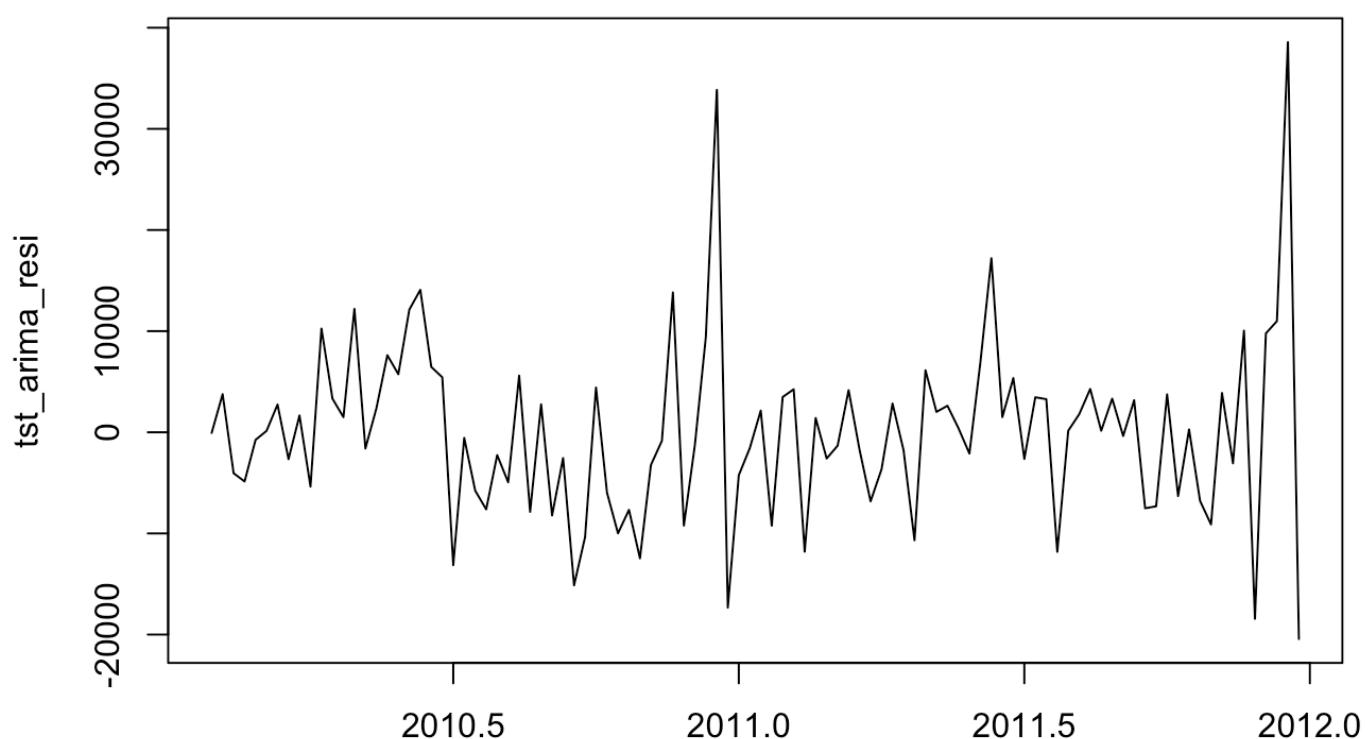
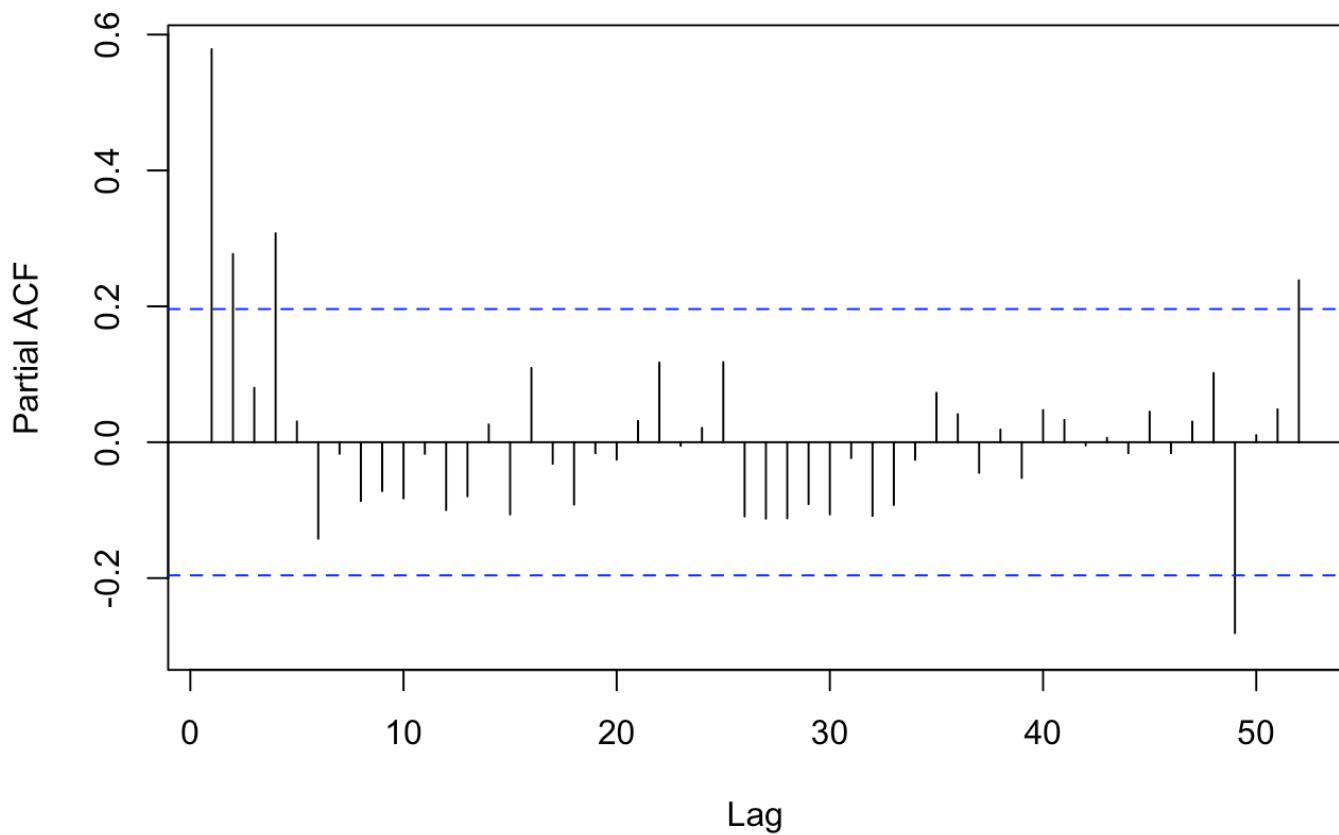
Time

Series train_sales

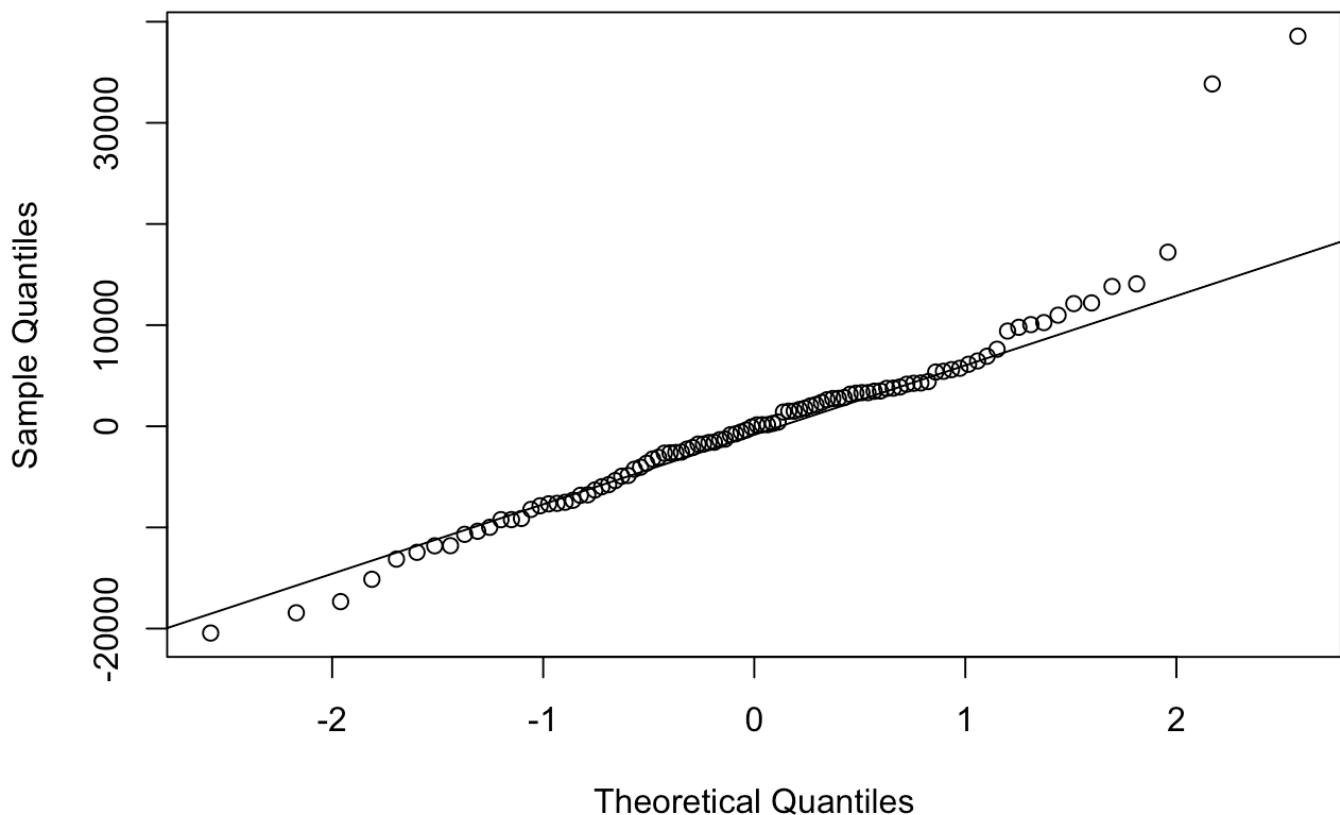
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

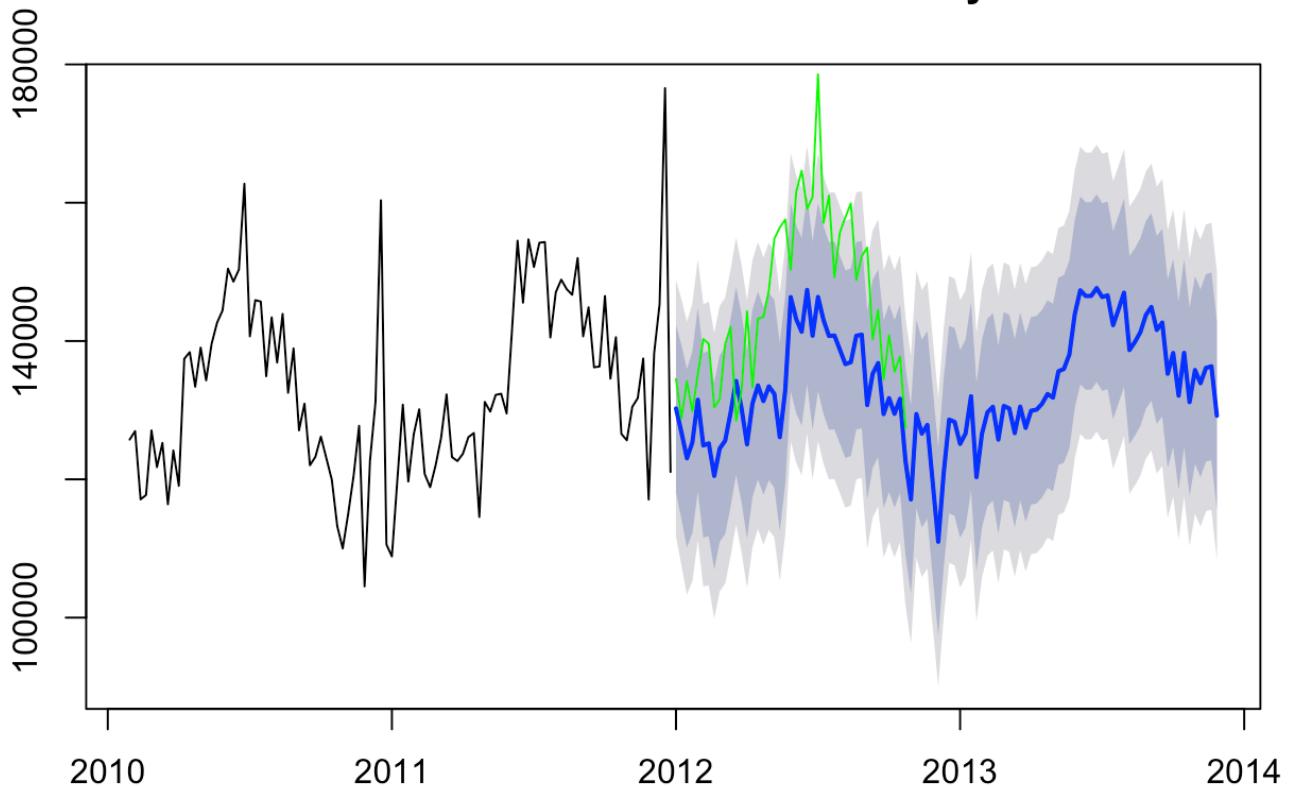

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



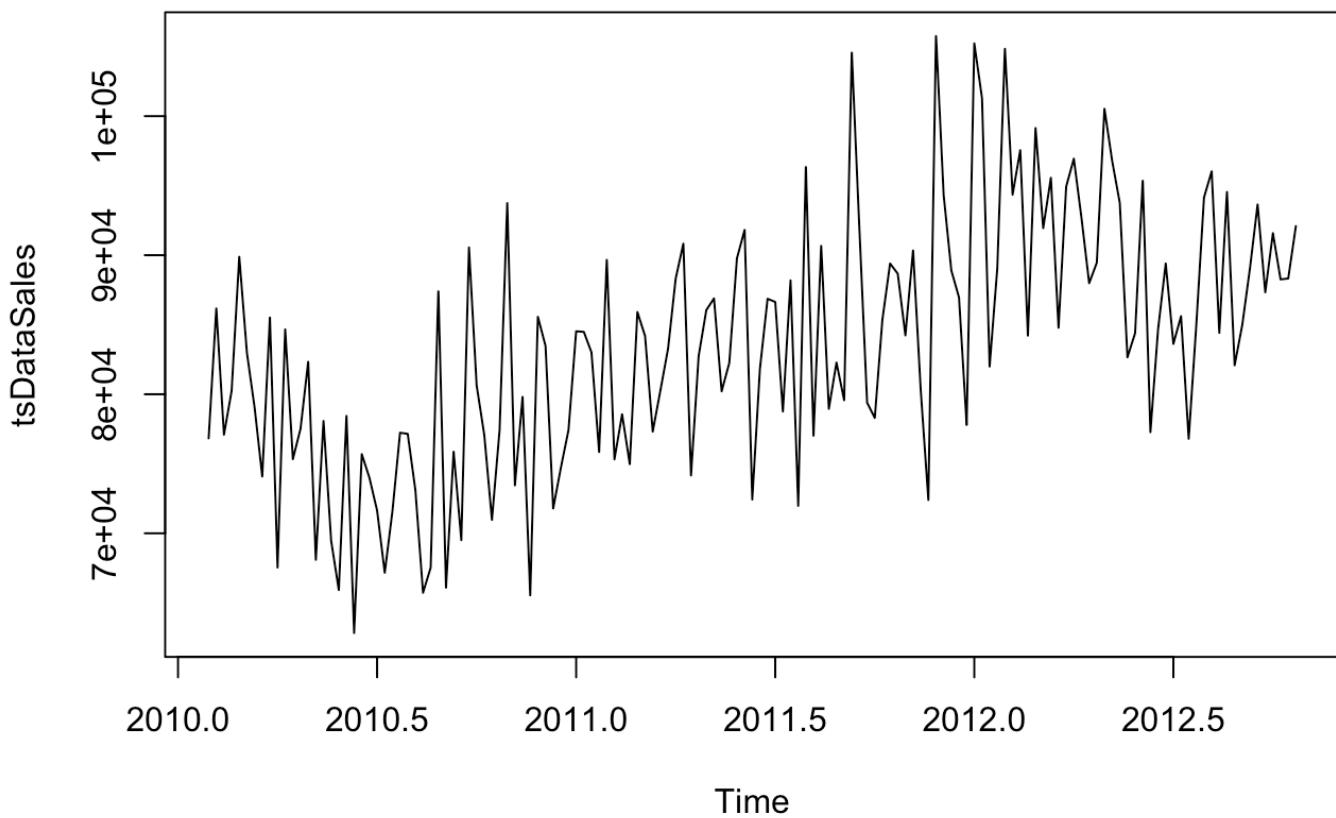
```

## [1] "12  out of  25  Completed"
## [1] "48 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  13 13 13 13 13 13 13 13 13 13 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE FALSE ...
## $ Dept        : int  38 38 38 38 38 38 38 38 38 38 ...
## $ Weekly_Sales: num  76829 86170 77094 80235 89884 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int  219622 219622 219622 219622 219622 219622 219622 219622 219622 219622 ...
## $ Temperature : num  31.5 33.2 35.7 30 40.6 ...
## $ Fuel_Price   : num  2.67 2.67 2.65 2.67 2.68 ...
## $ MarkDown1    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5    : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI          : num  126 126 127 127 127 ...
## $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
##
## 
## iter imp variable

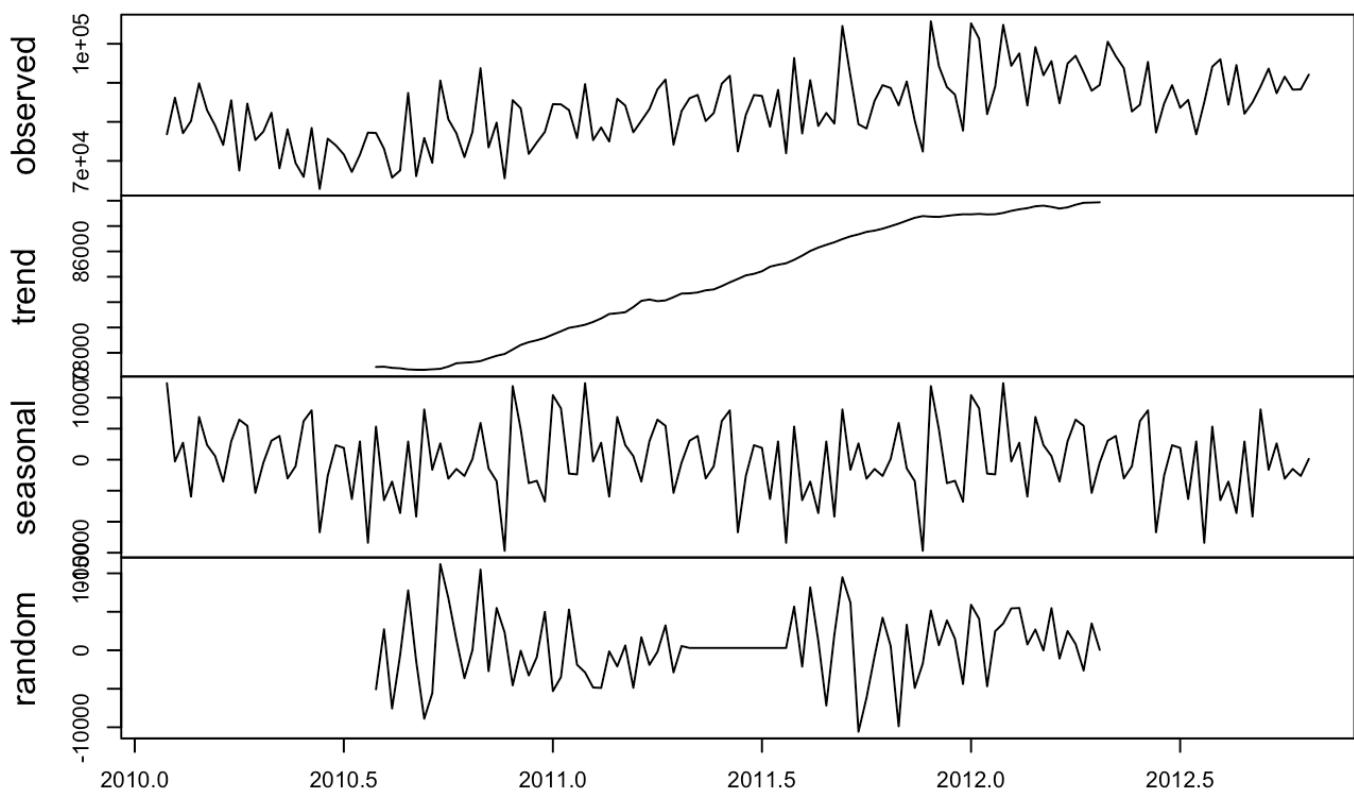
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

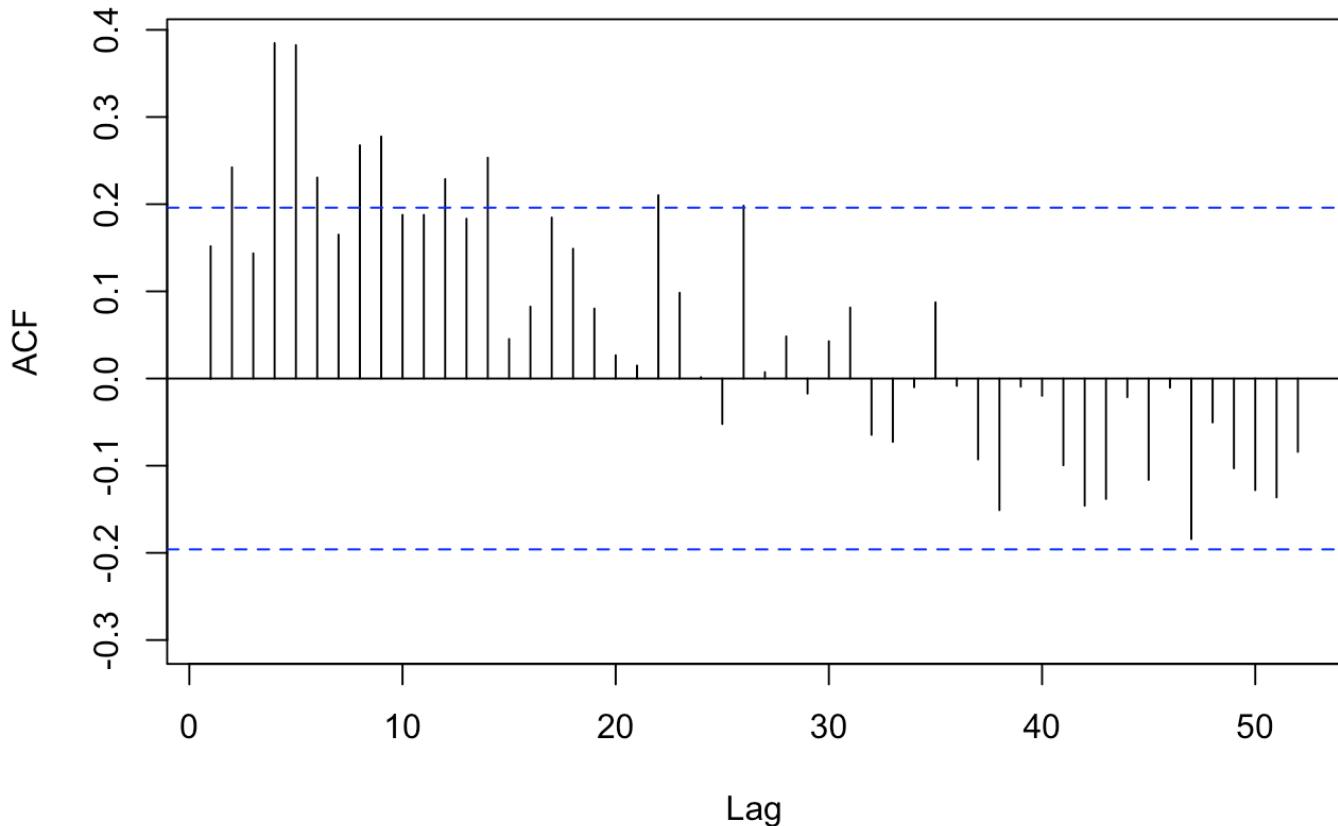
```
## [1] "Showing the results of store = 13 department = 38"
```



Decomposition of additive time series



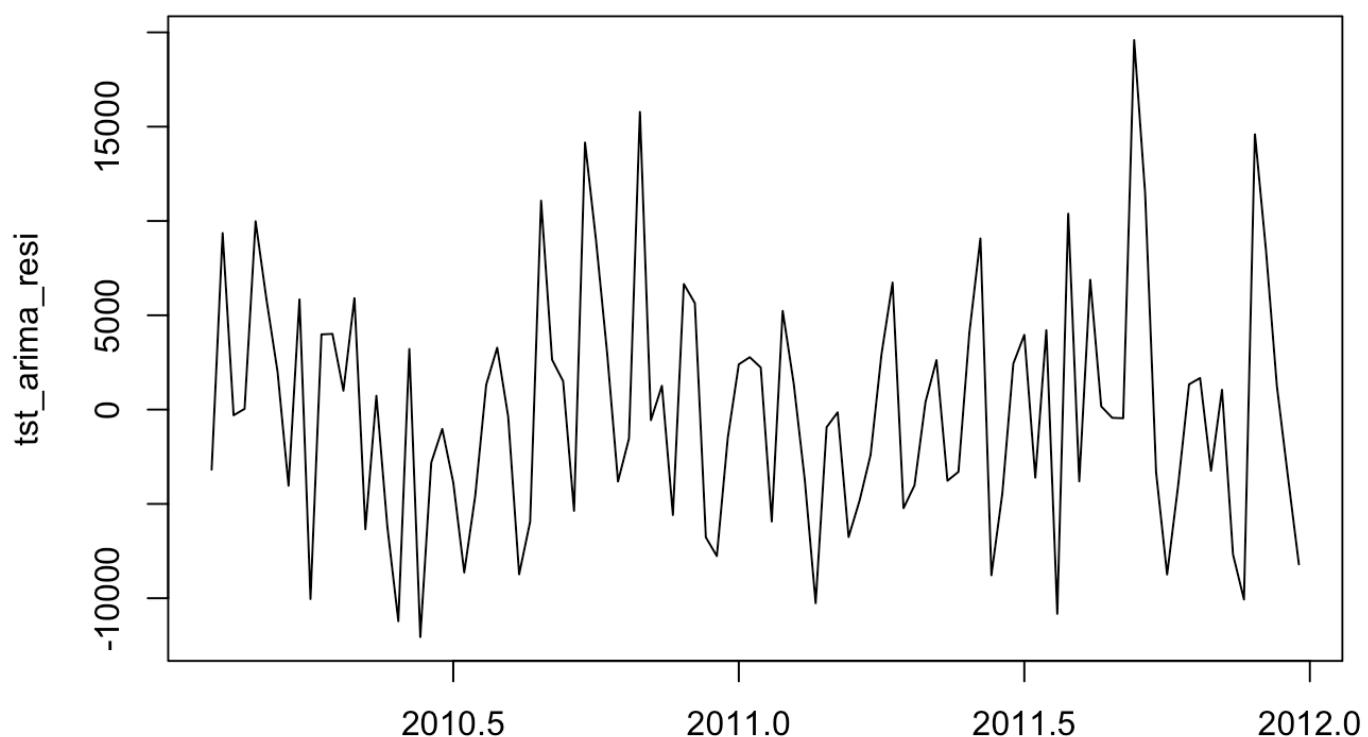
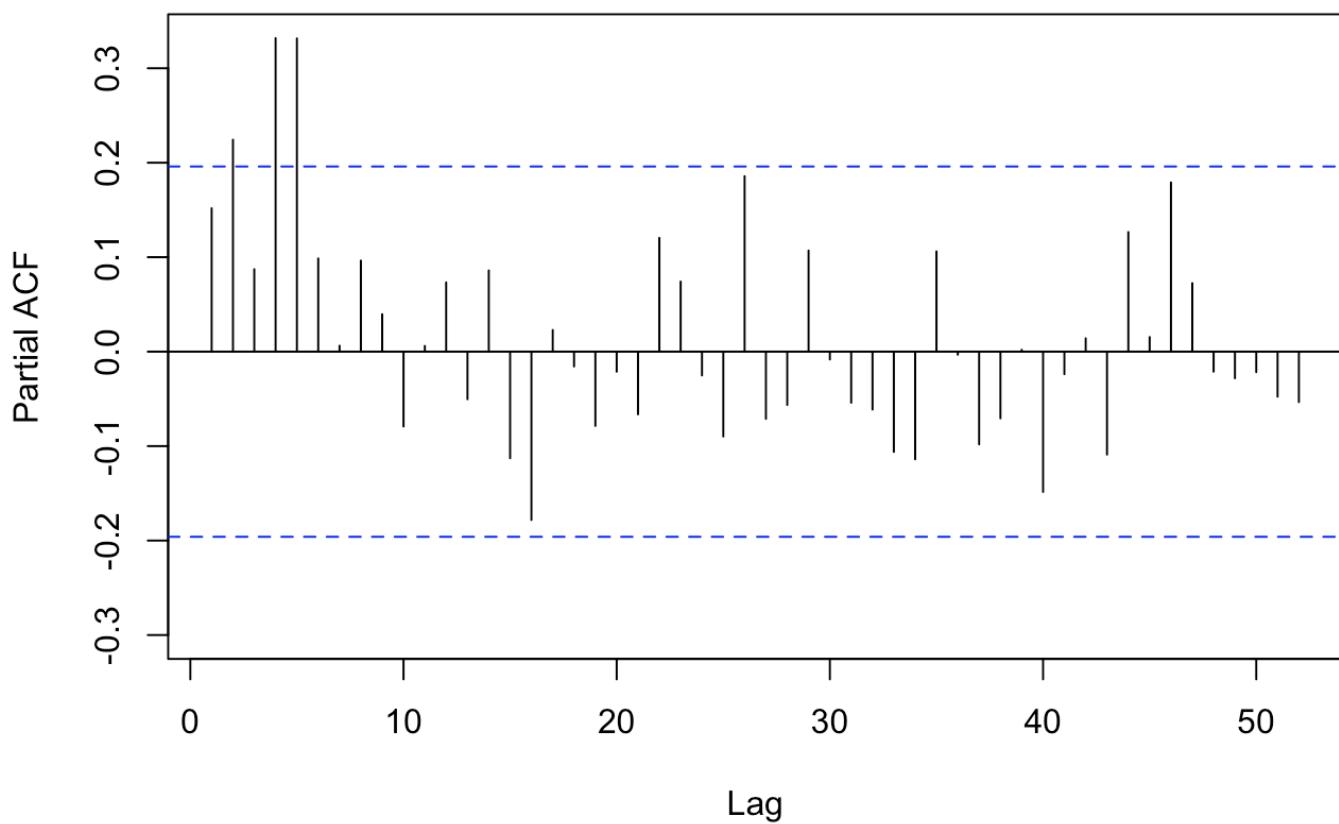
Time

Series train_sales

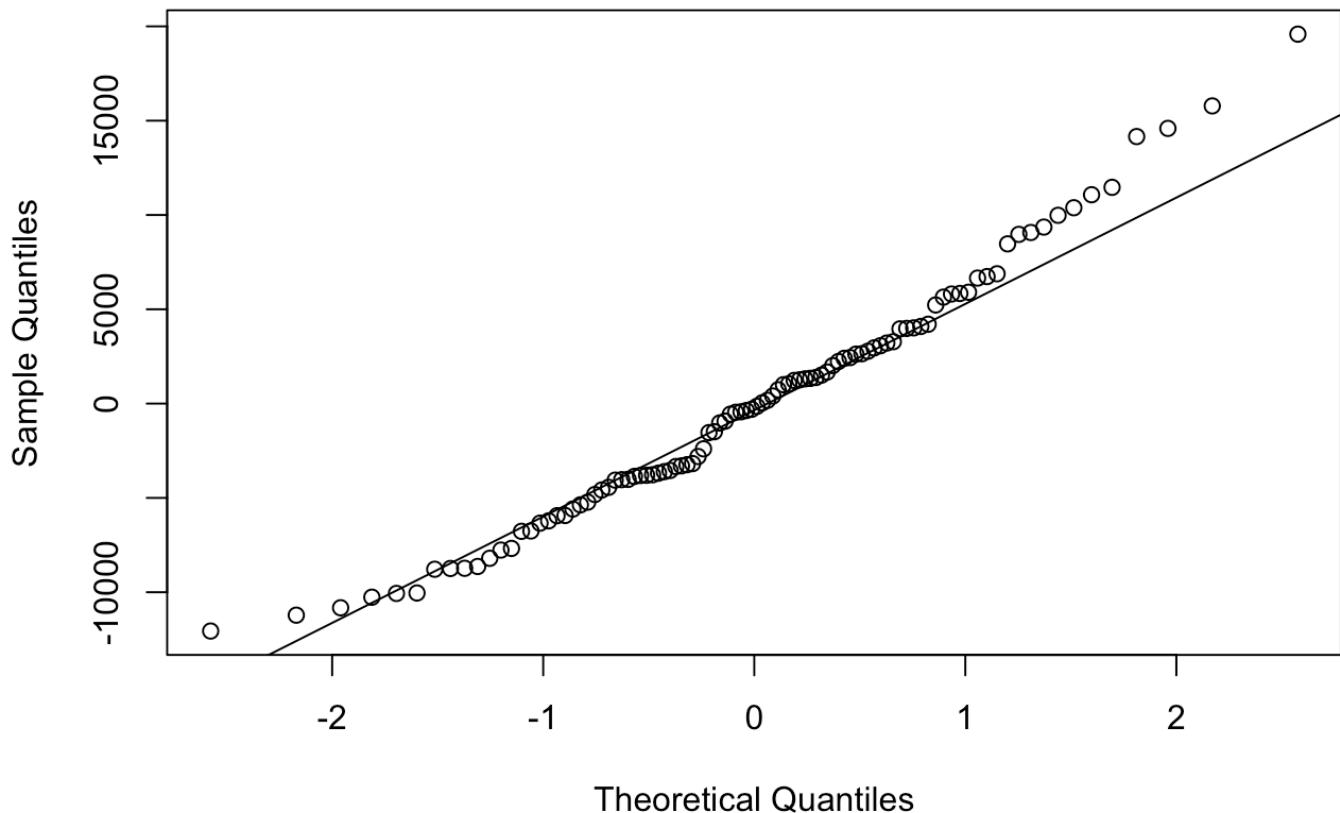
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

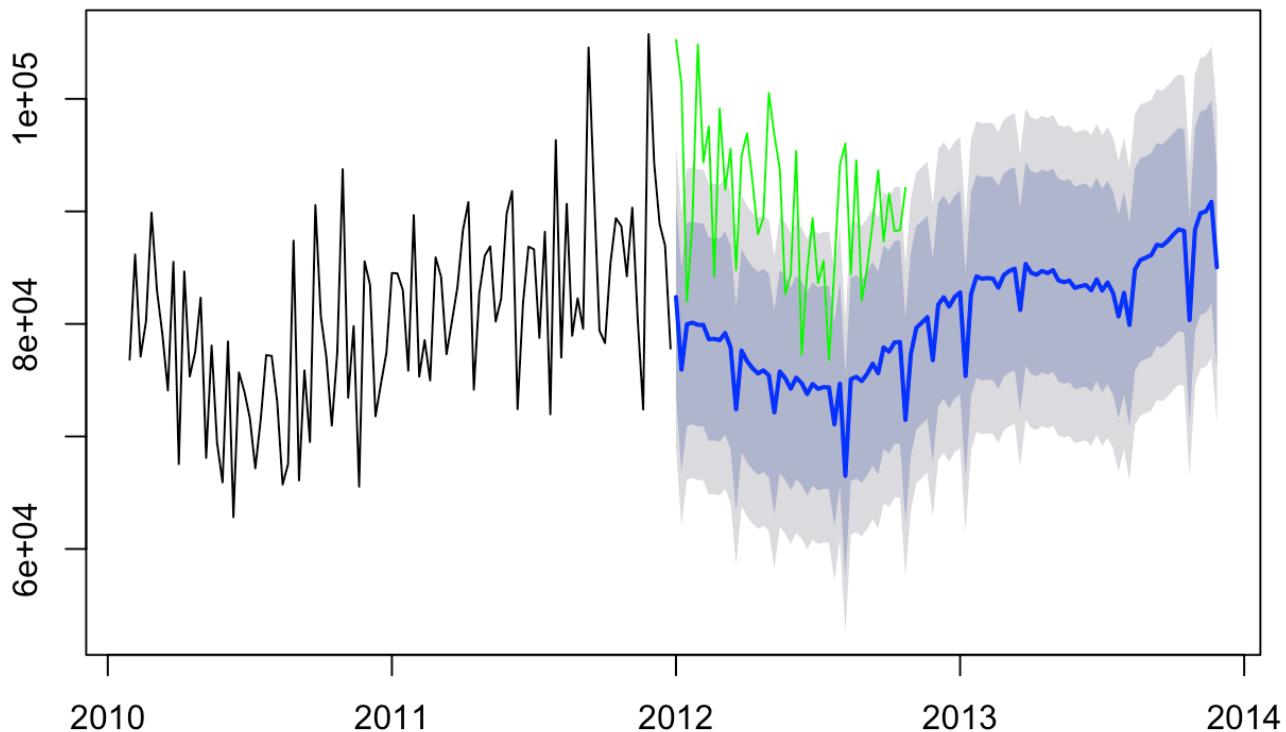

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



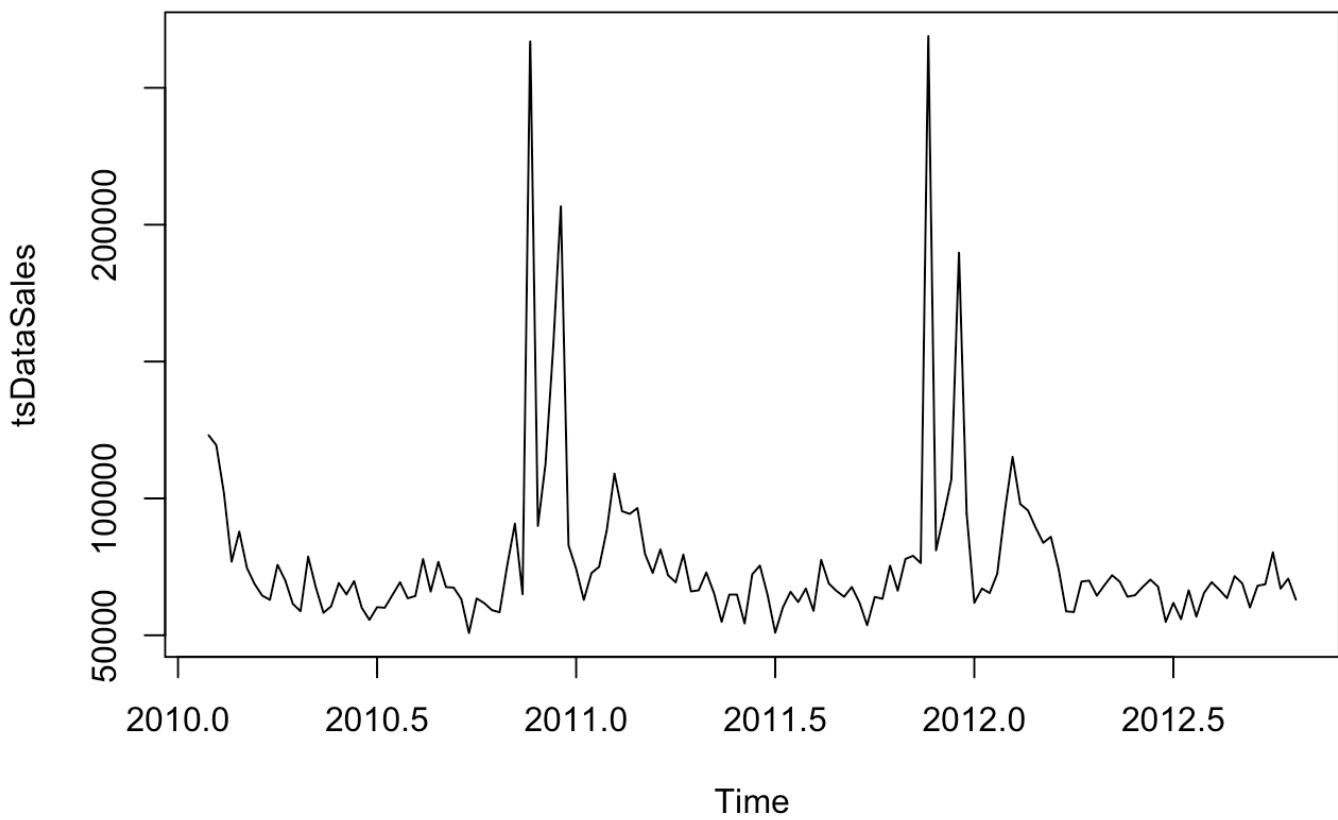
```

## [1] "13  out of  25  Completed"
## [1] "52 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  13 13 13 13 13 13 13 13 13 13 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
## $ Weekly_Sales: num  123071 119428 101918 76903 87874 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int  219622 219622 219622 219622 219622 219622 219622 219622 ...
## $ Temperature: num  31.5 33.2 35.7 30 40.6 ...
## $ Fuel_Price  : num  2.67 2.67 2.65 2.67 2.68 ...
## $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num  126 126 127 127 127 ...
## $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
##
## 
## iter imp variable

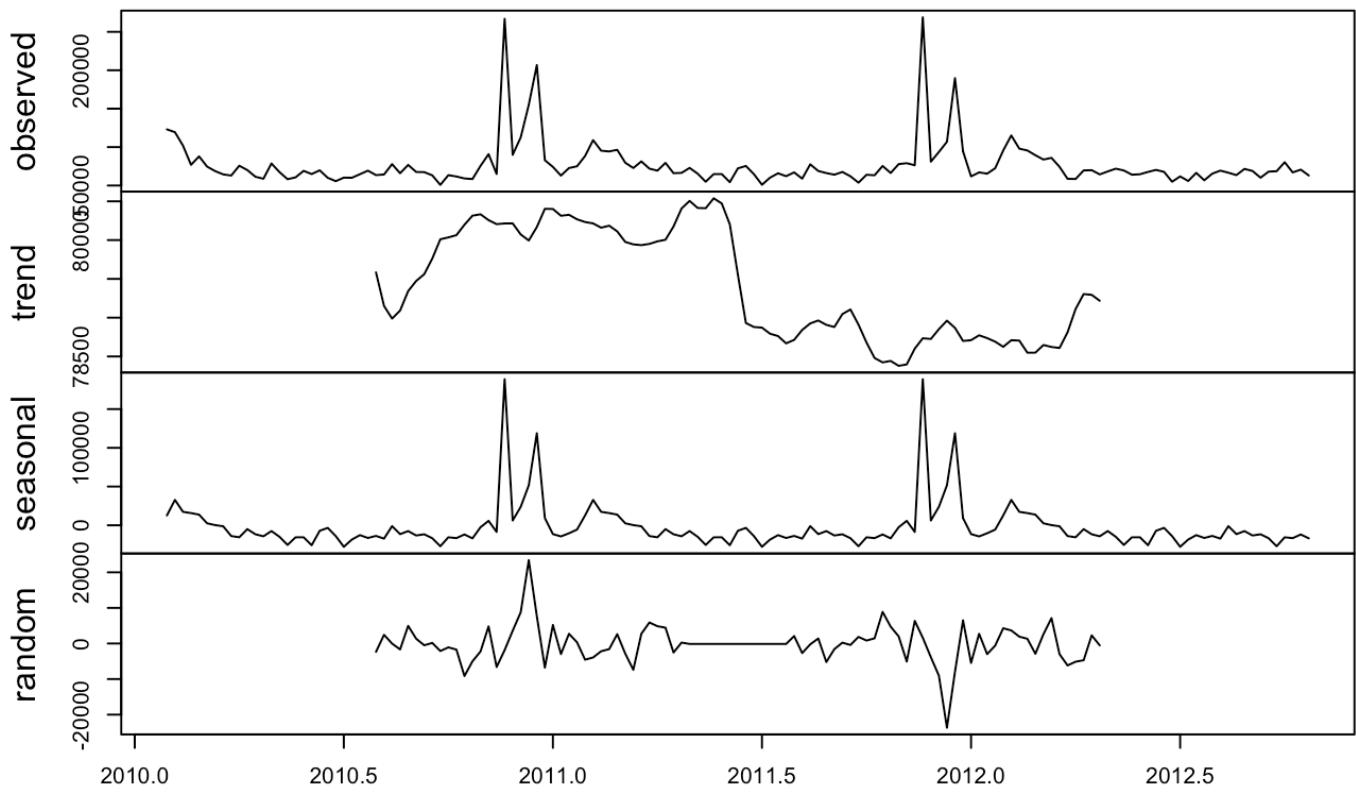
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

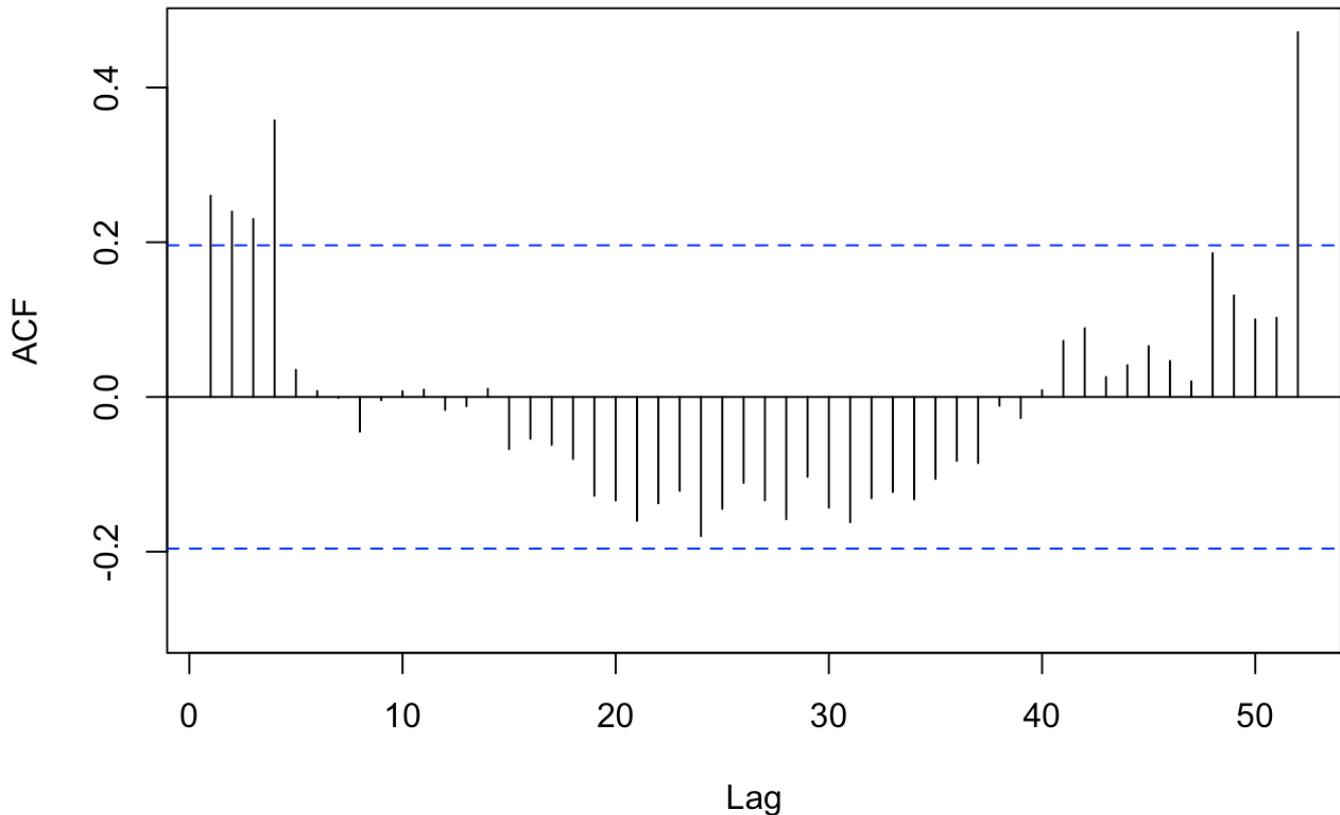
```
## [1] "Showing the results of store = 13 department = 72"
```



Decomposition of additive time series



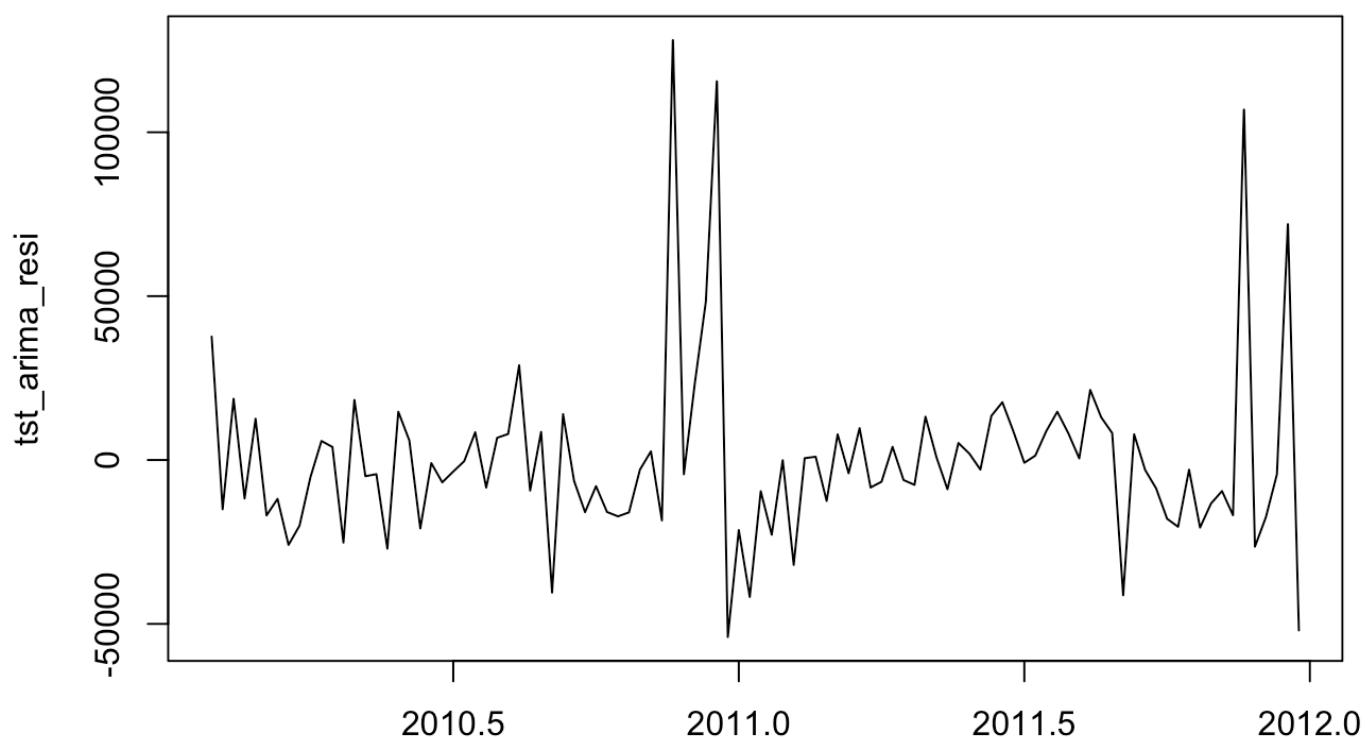
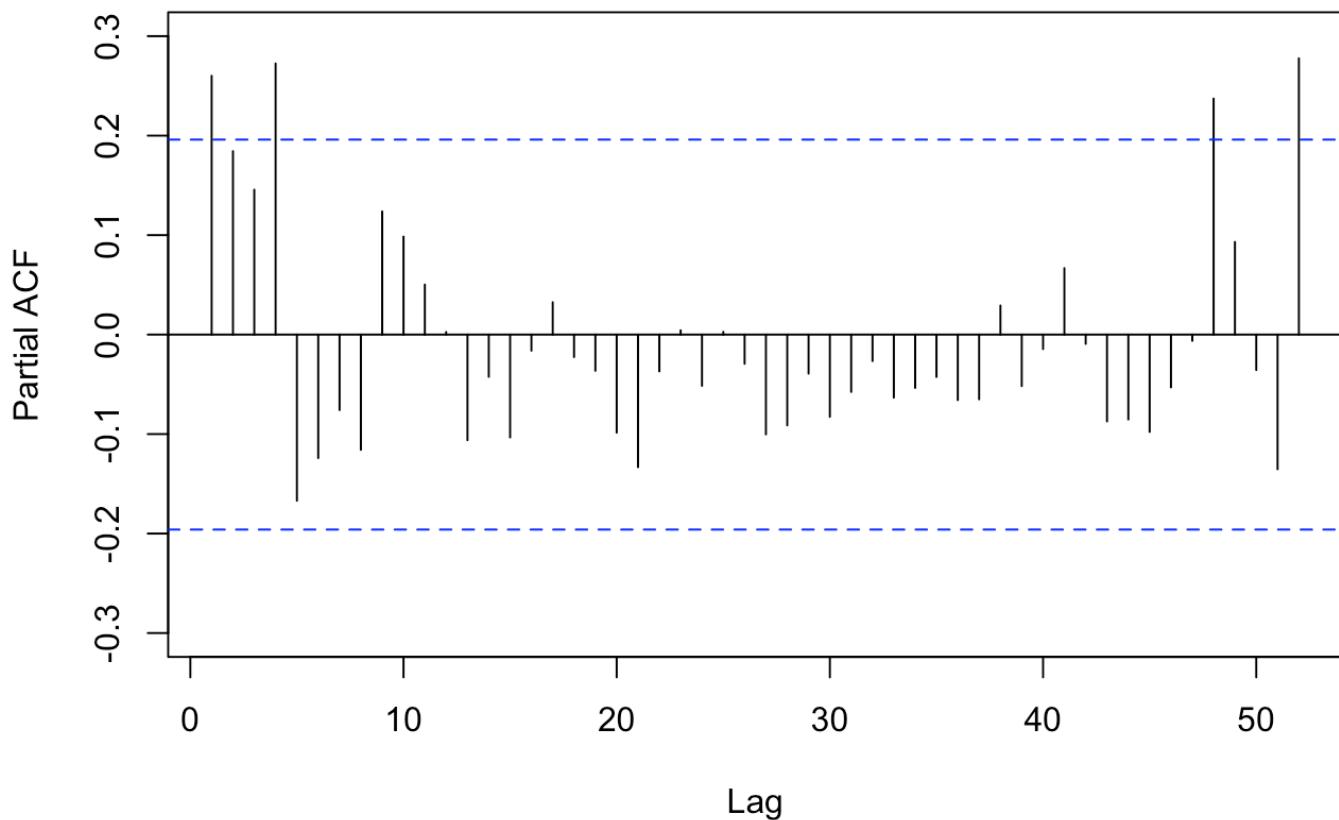
Time

Series train_sales

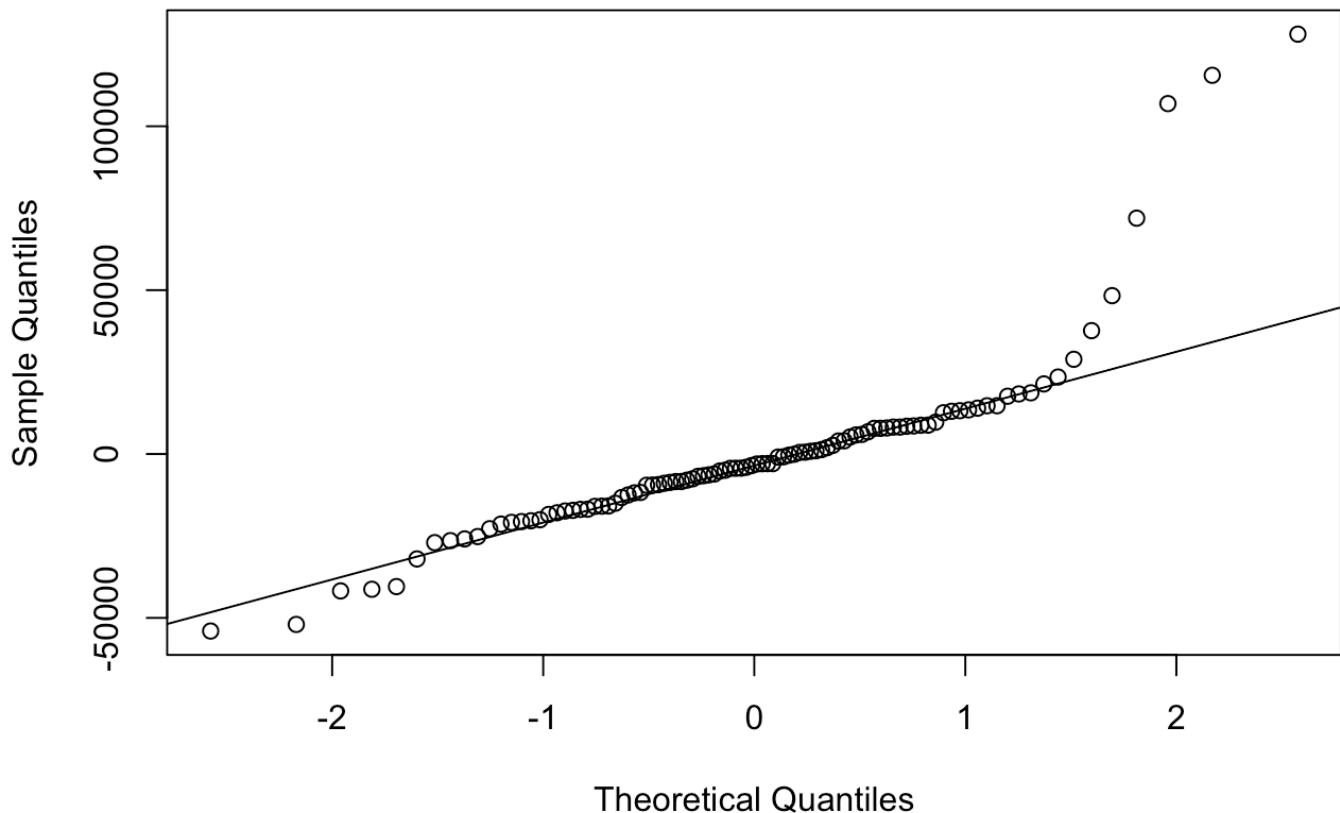
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

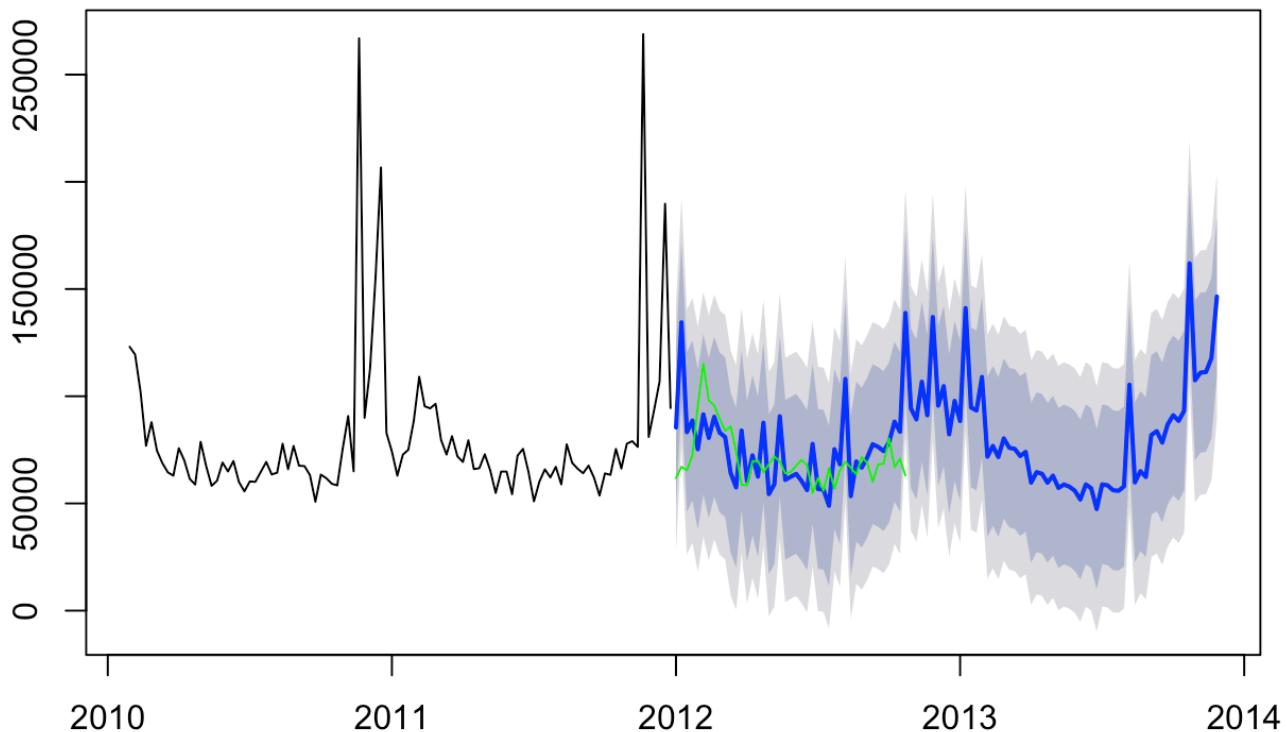

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "14  out of  25  Completed"
## [1] "56 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  13 13 13 13 13 13 13 13 13 13 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  111718 104969 109374 102987 108390 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  219622 219622 219622 219622 219622 219622 219622 219622 ...
##   $ Temperature: num  31.5 33.2 35.7 30 40.6 ...
##   $ Fuel_Price  : num  2.67 2.67 2.65 2.67 2.68 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  126 126 127 127 127 ...
##   $ Unemployment: num  8.32 8.32 8.32 8.32 8.32 ...
##
## 
## iter imp variable

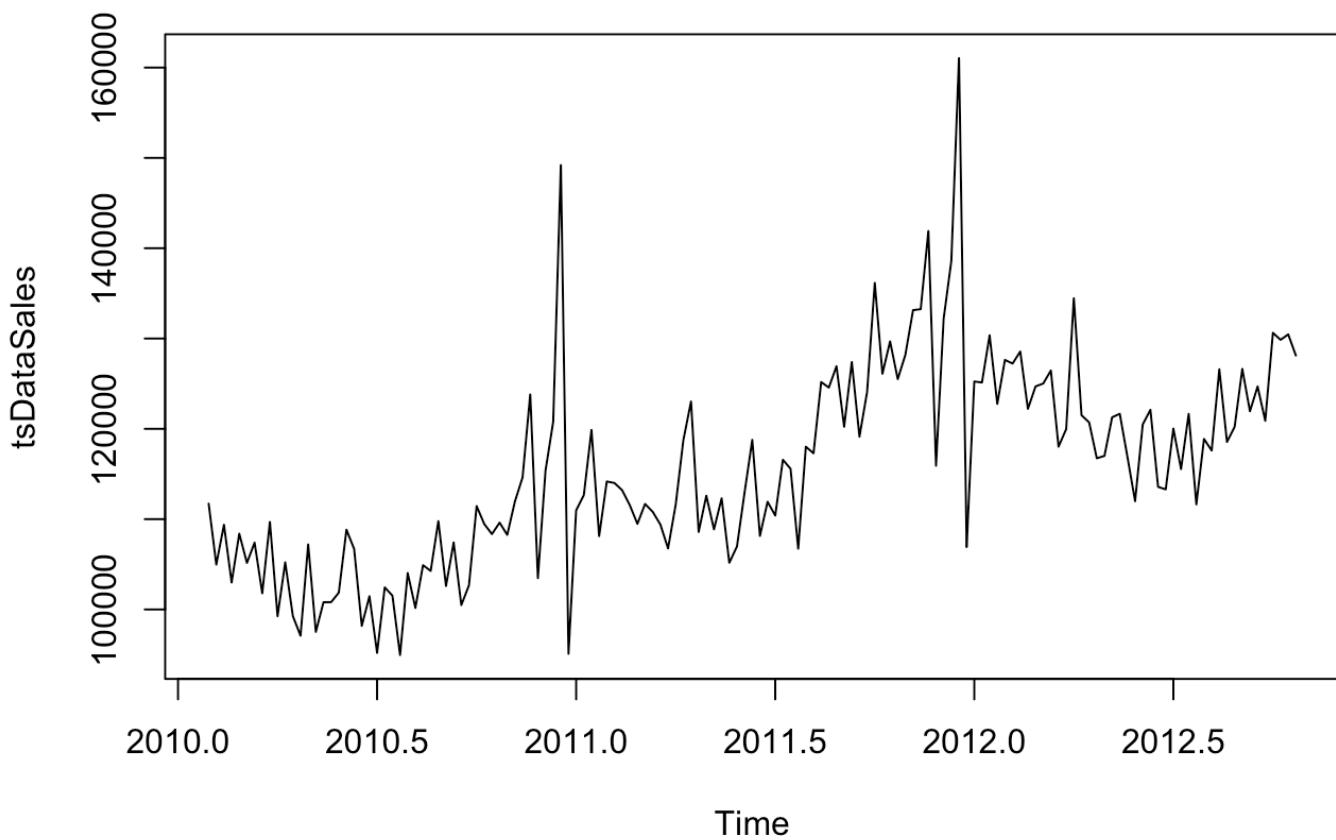
```

```

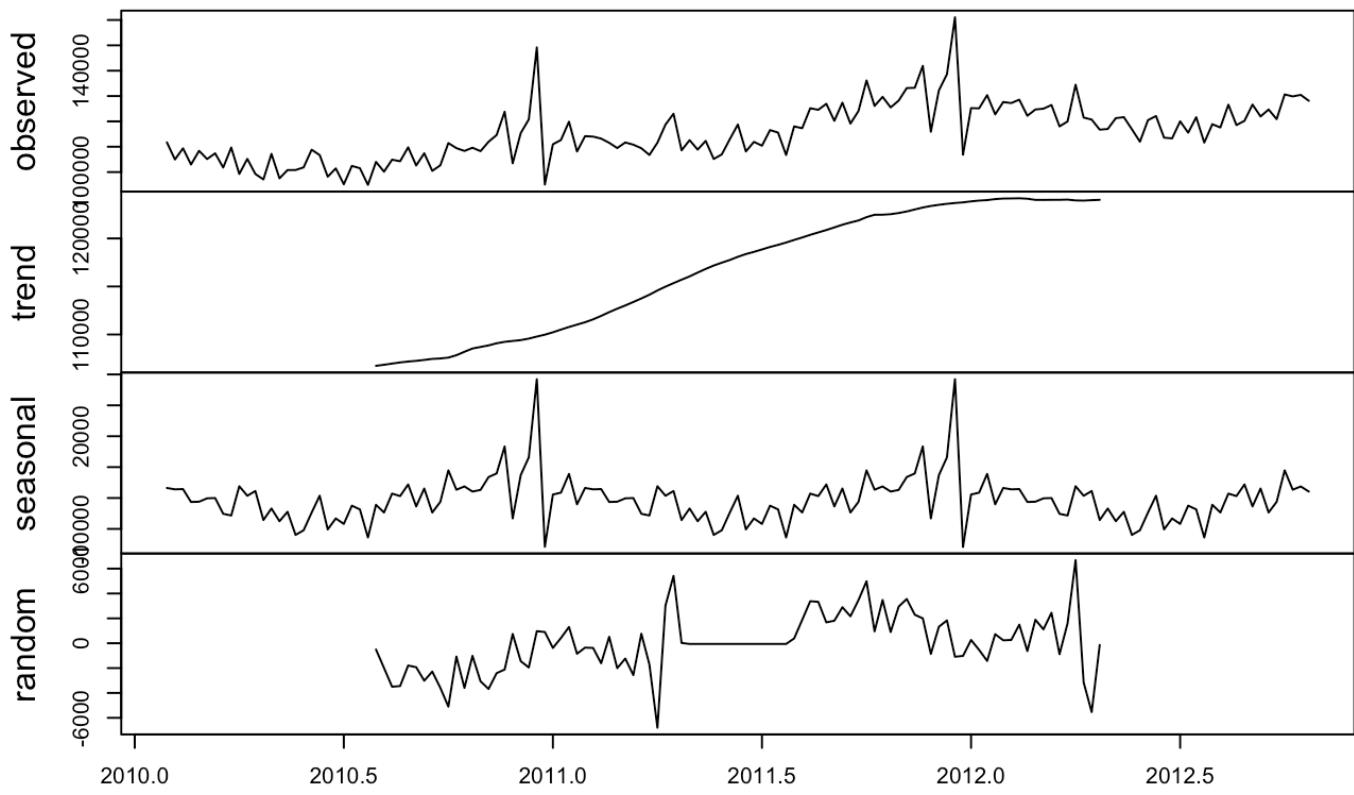
## 1 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 1 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 2 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 3 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 4 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 5 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 6 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 7 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 8 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 9 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 1 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 2 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 3 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 4 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5
## 10 5 MarkDown1 MarkDown2 MarkDown3 MarkDown4 MarkDown5

```

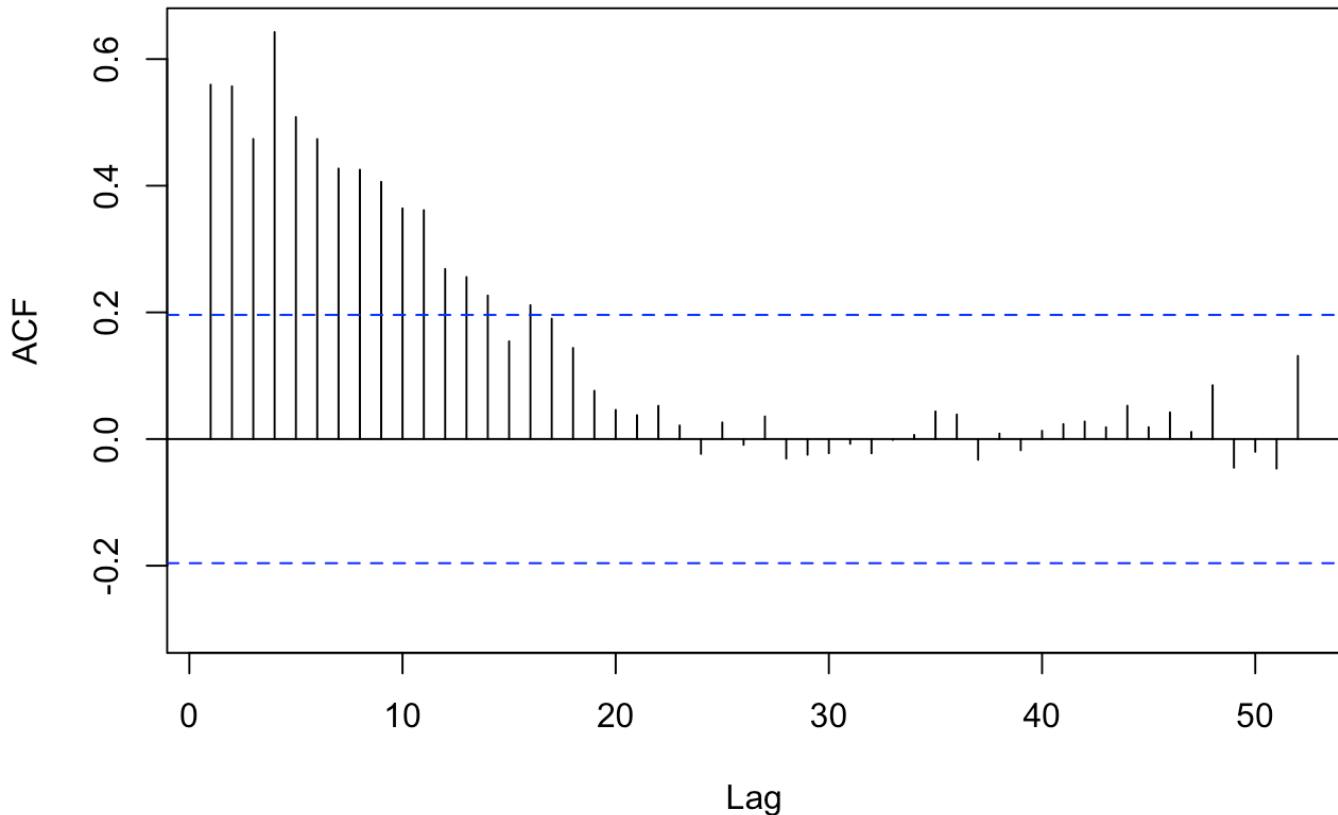
```
## [1] "Showing the results of store = 13 department = 90"
```



Decomposition of additive time series



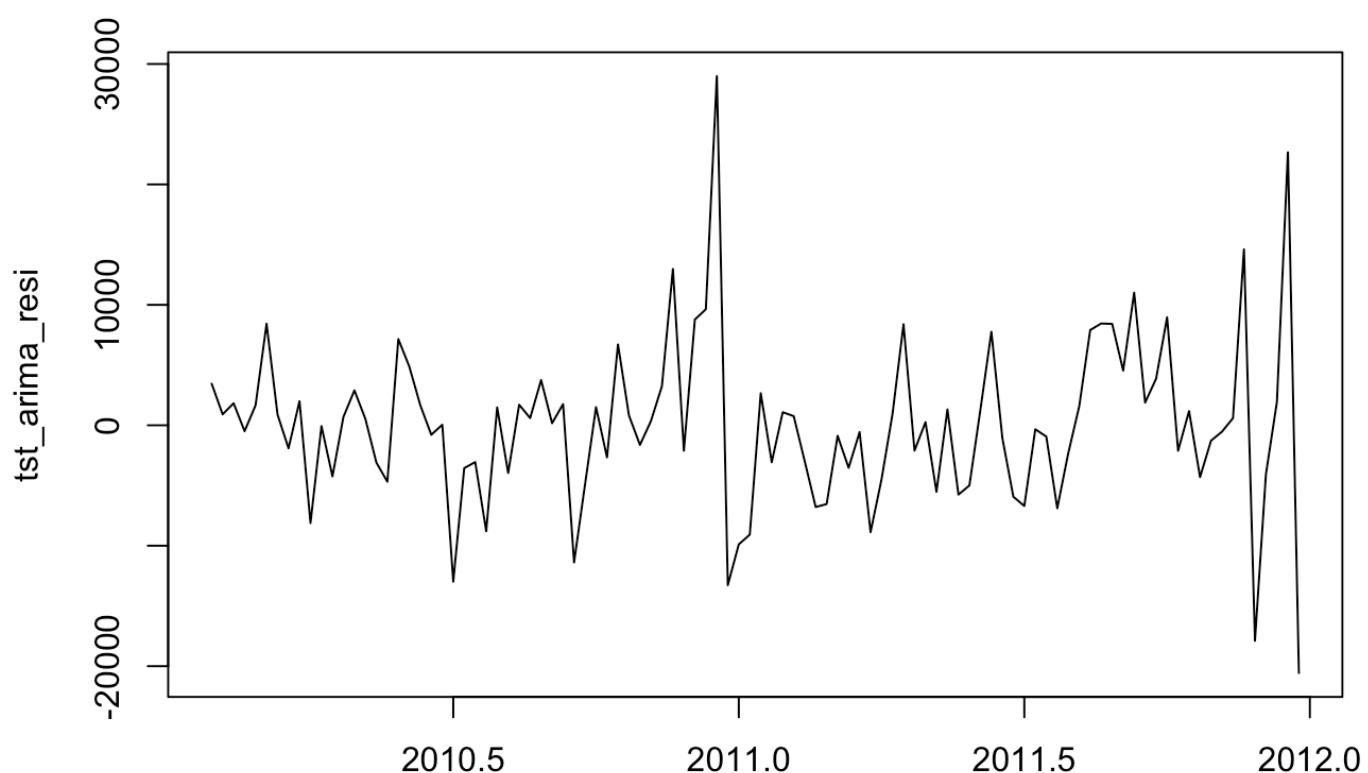
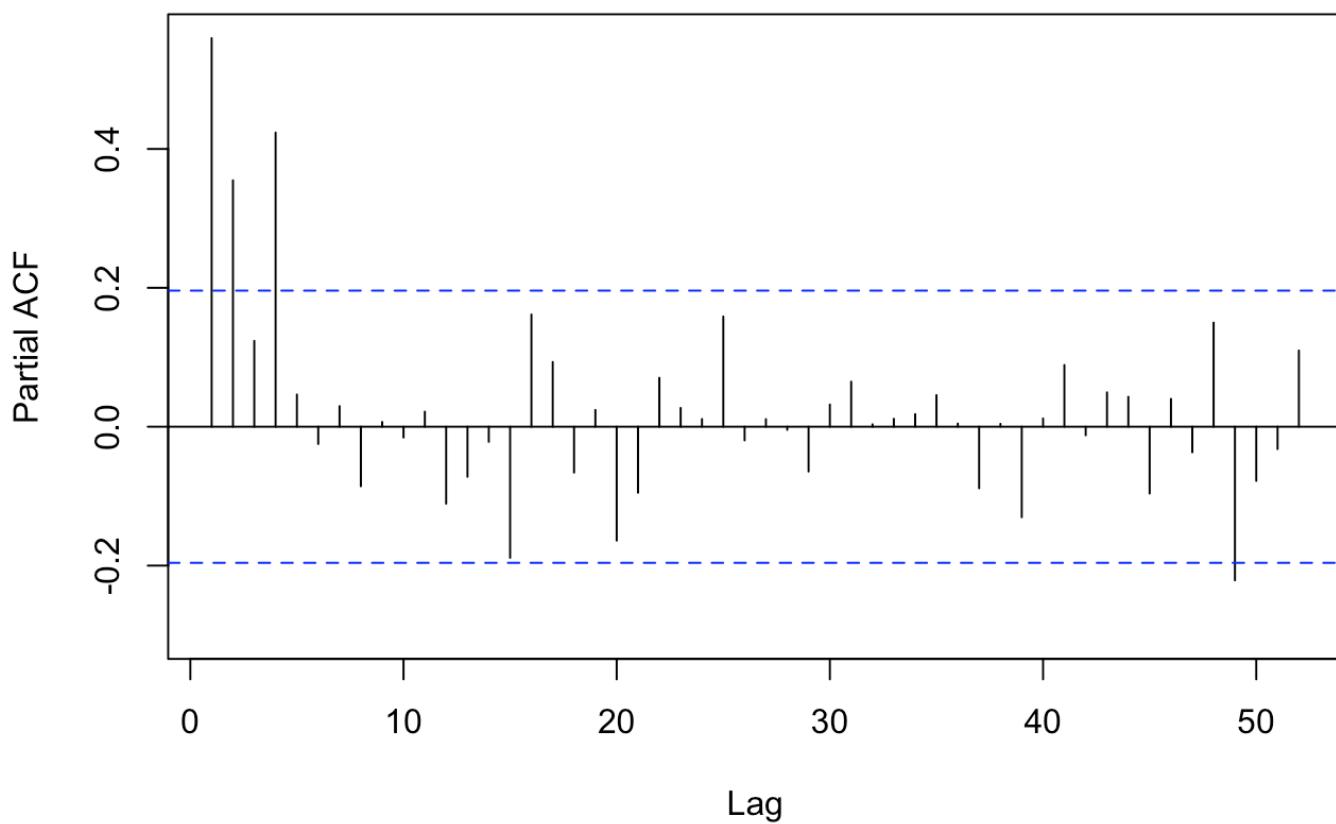
Time

Series train_sales

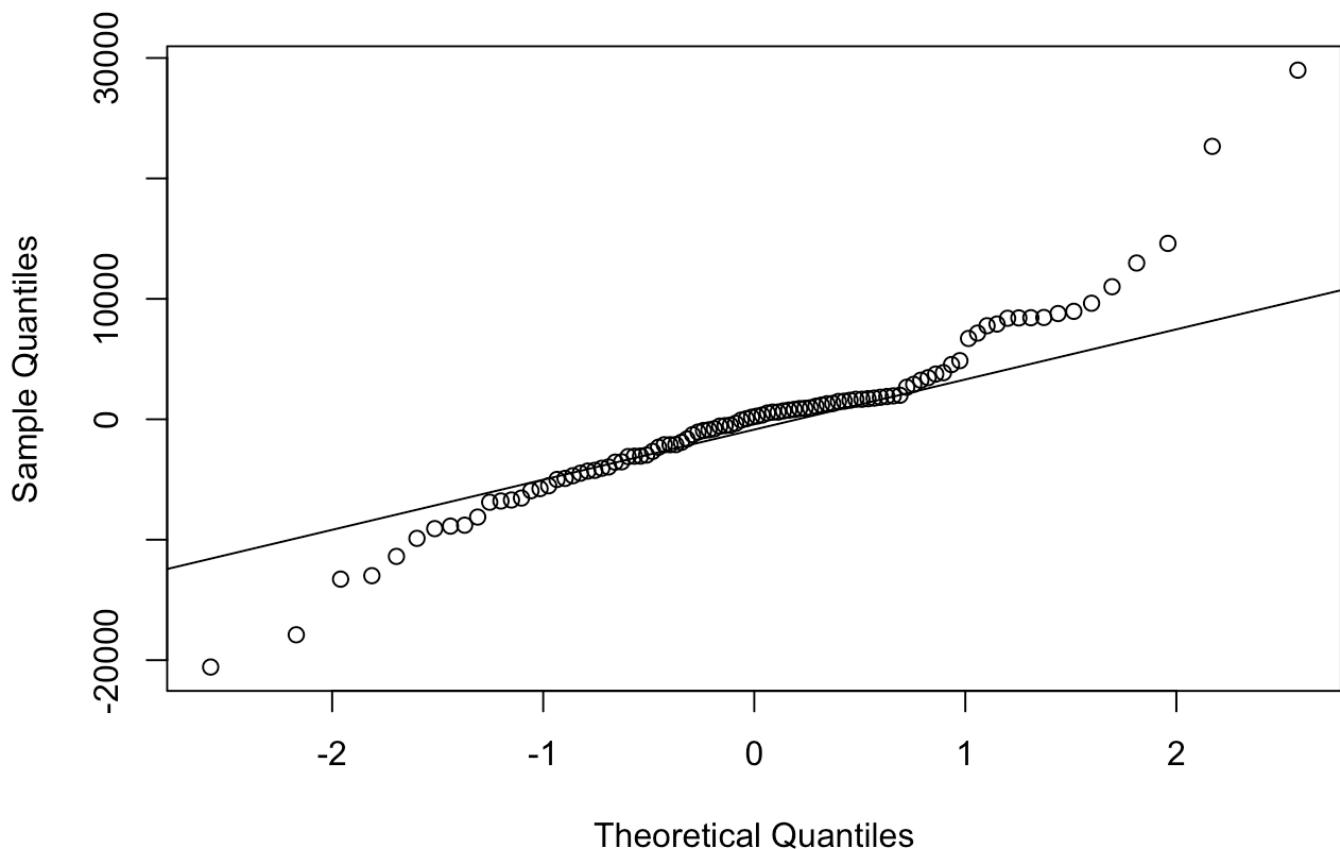
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

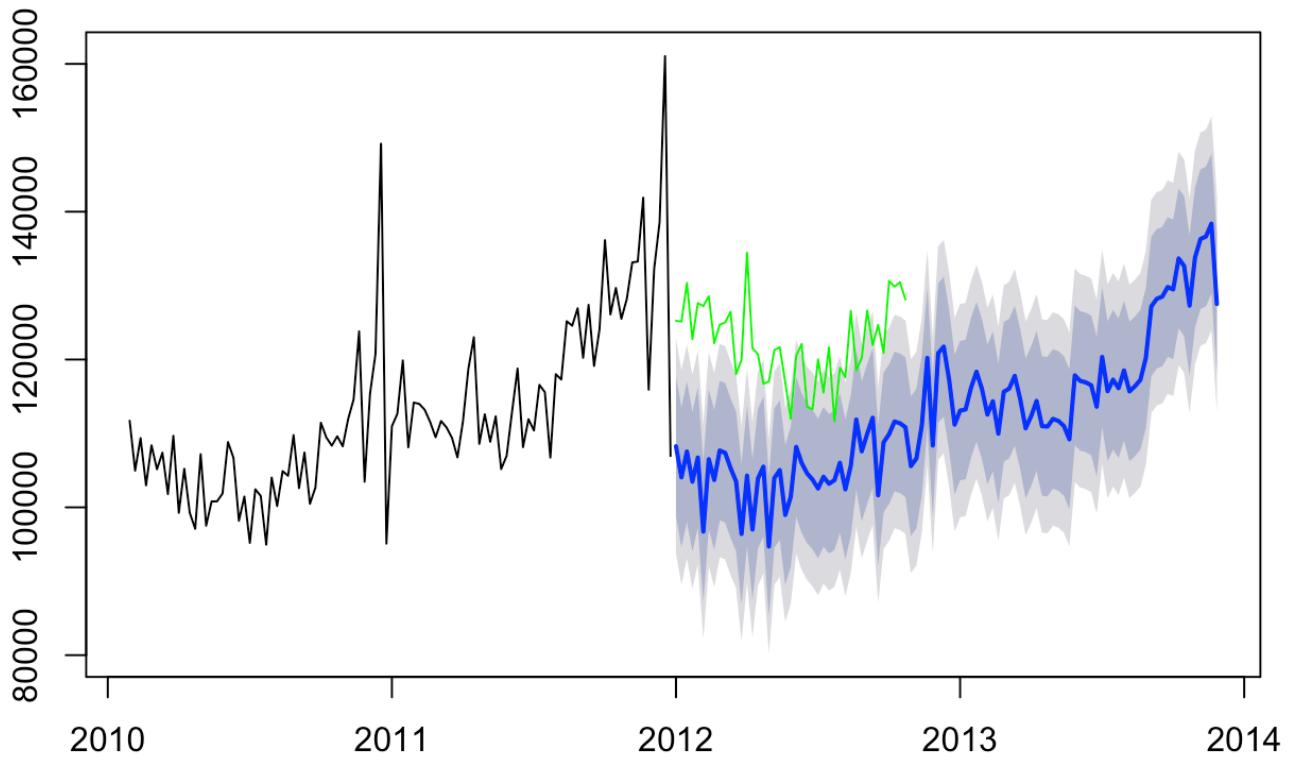

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "15  out of  25  Completed"
## [1] "60 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  14 14 14 14 14 14 14 14 14 14 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE FALSE ...
## $ Dept        : int  92 92 92 92 92 92 92 92 92 ...
## $ Weekly_Sales: num  293966 151901 192282 205251 214383 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int  200898 200898 200898 200898 200898 200898 200898 200898 200898 ...
## $ Temperature : num  27.3 27.7 31.3 34.9 37.1 ...
## $ Fuel_Price   : num  2.78 2.77 2.75 2.75 2.78 ...
## $ MarkDown1    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4    : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5    : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI         : num  182 182 182 182 182 ...
## $ Unemployment: num  8.99 8.99 8.99 8.99 8.99 ...
## 
## iter imp variable

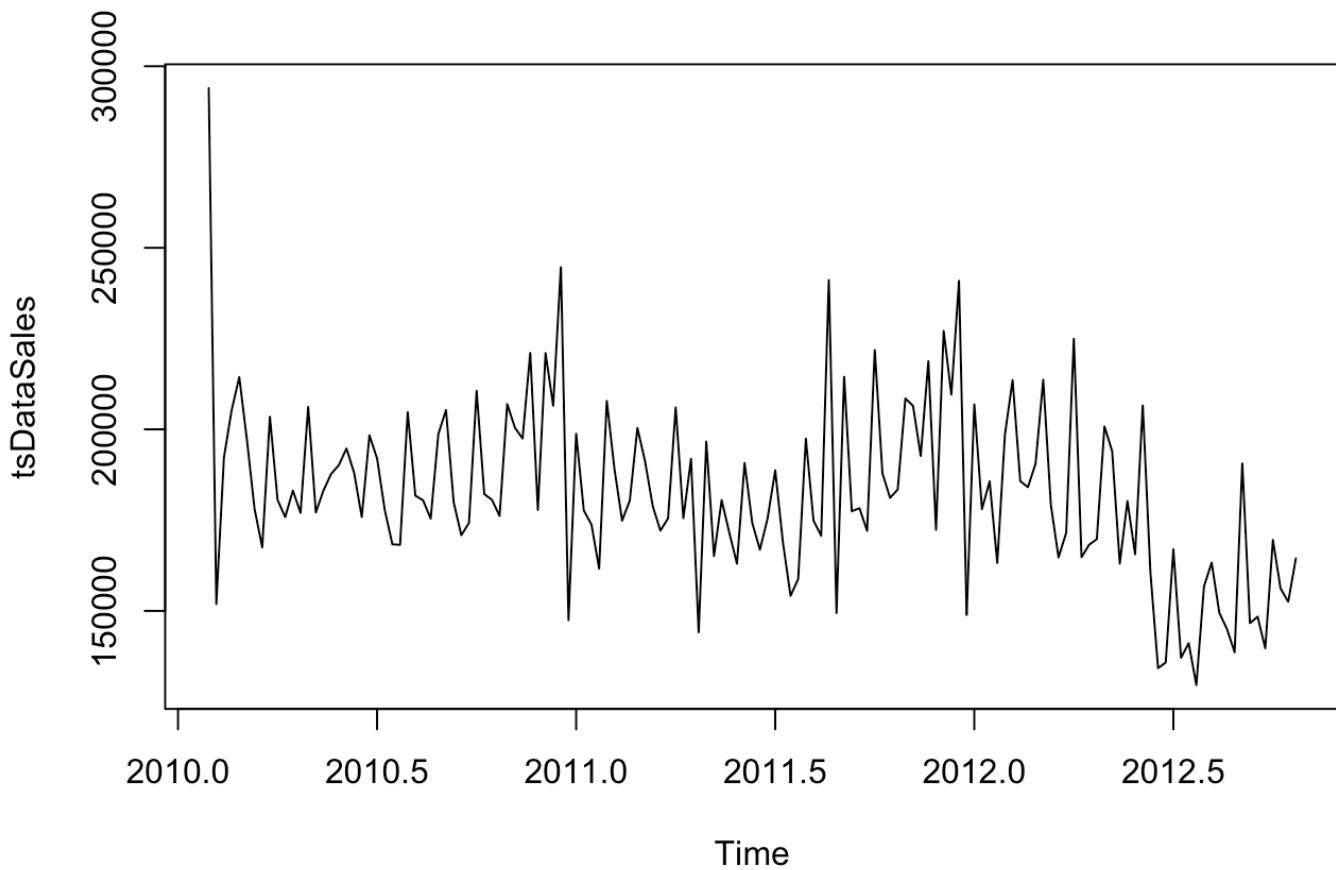
```

```

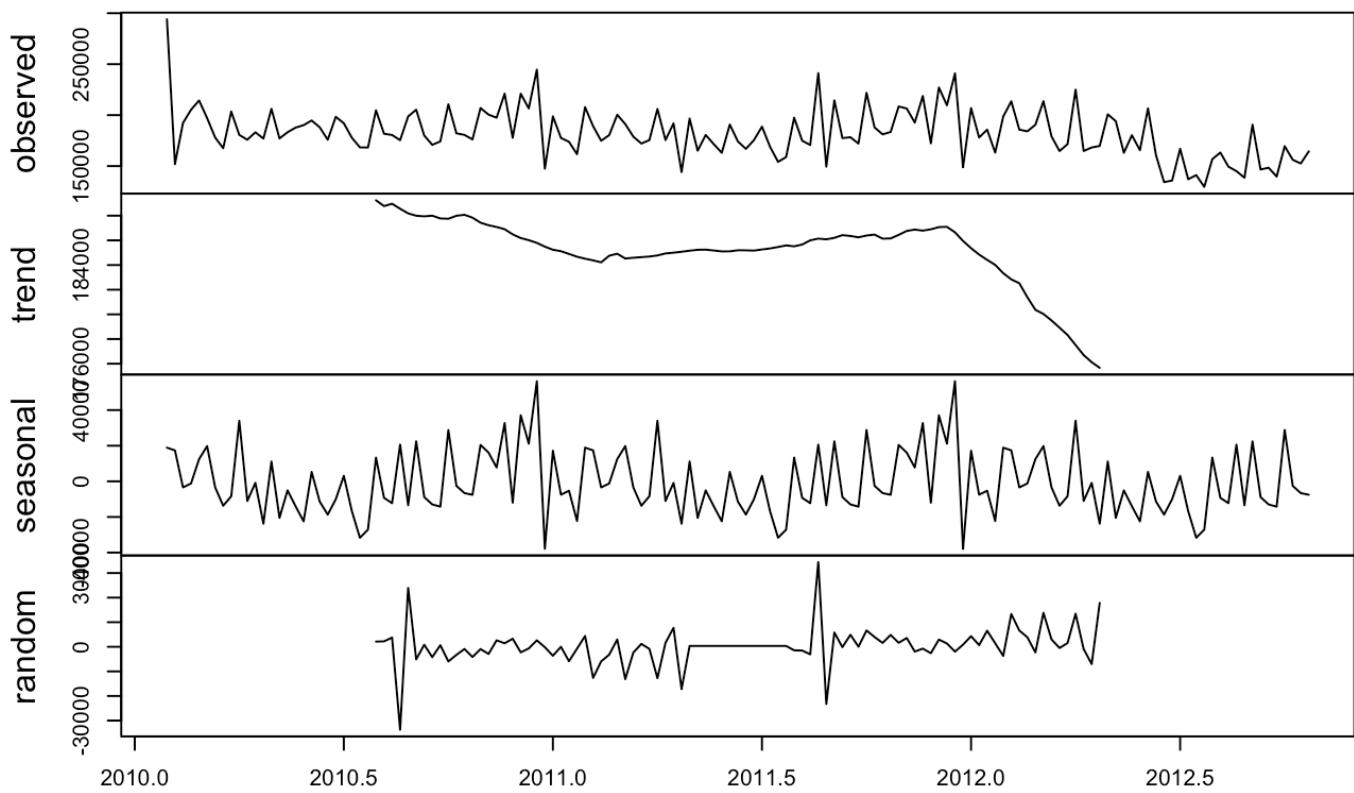
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5

```

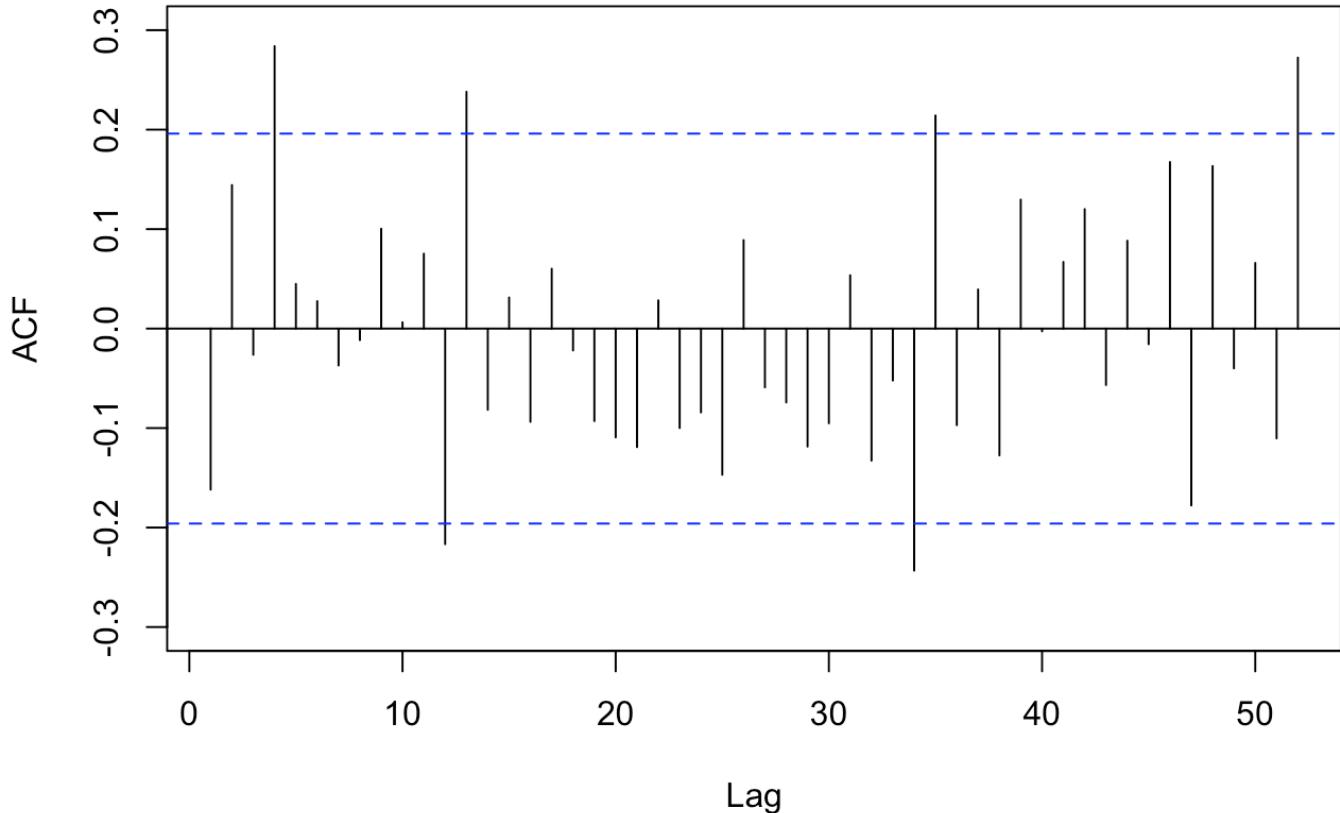
```
## [1] "Showing the results of store = 14 department = 92"
```



Decomposition of additive time series



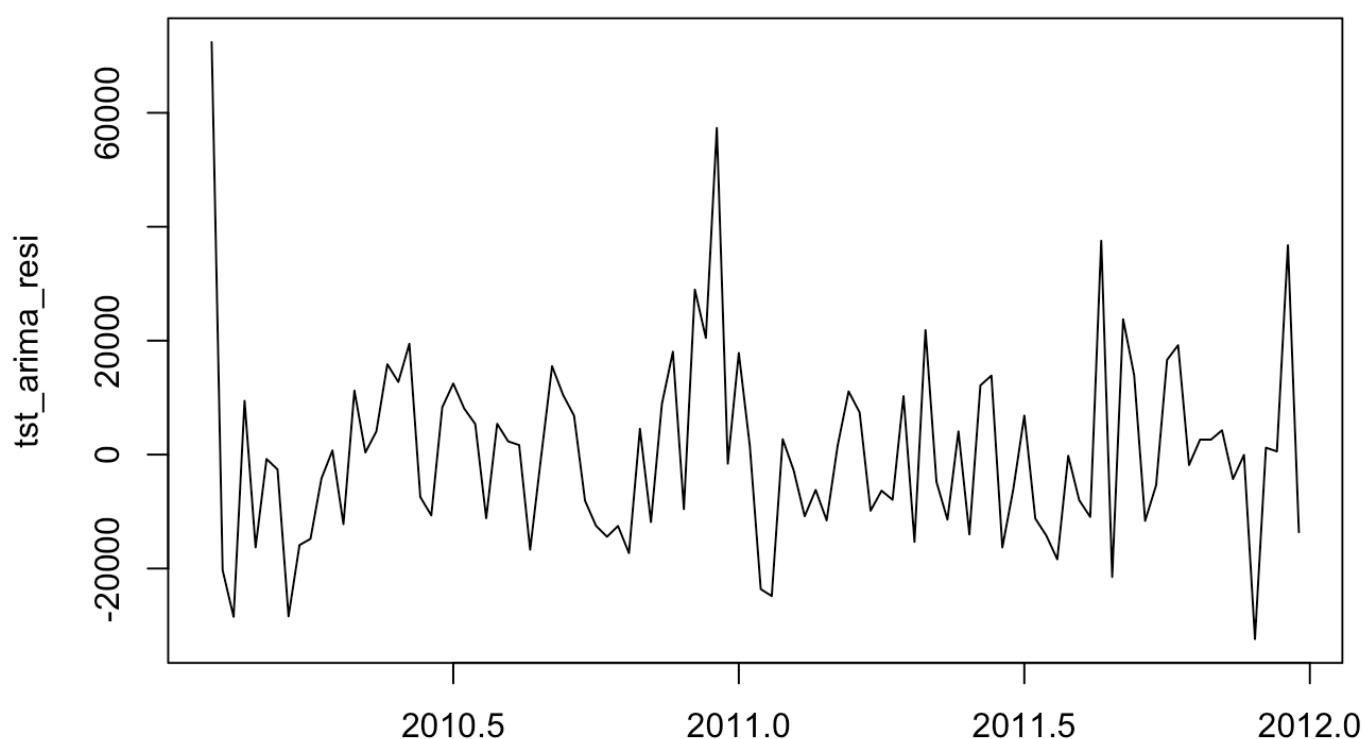
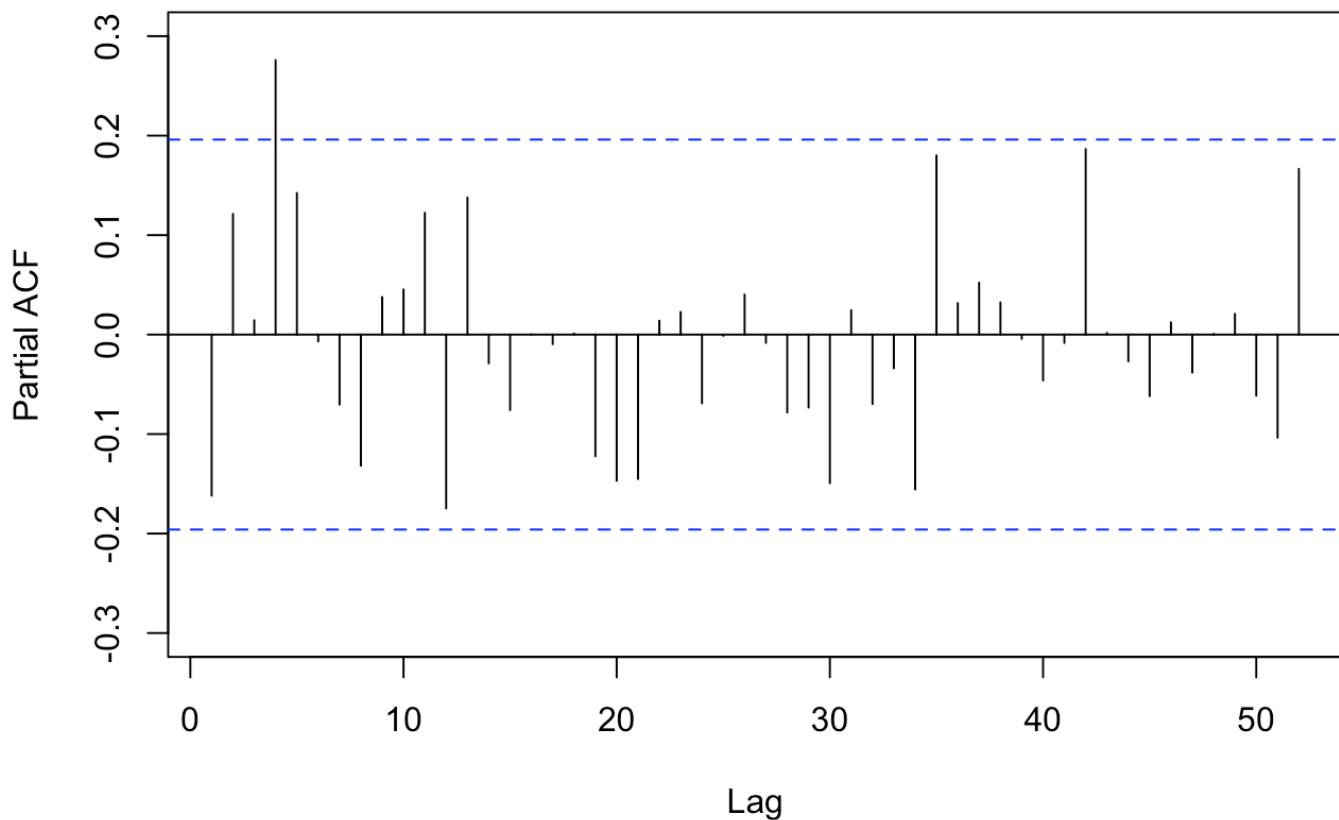
Time

Series train_sales

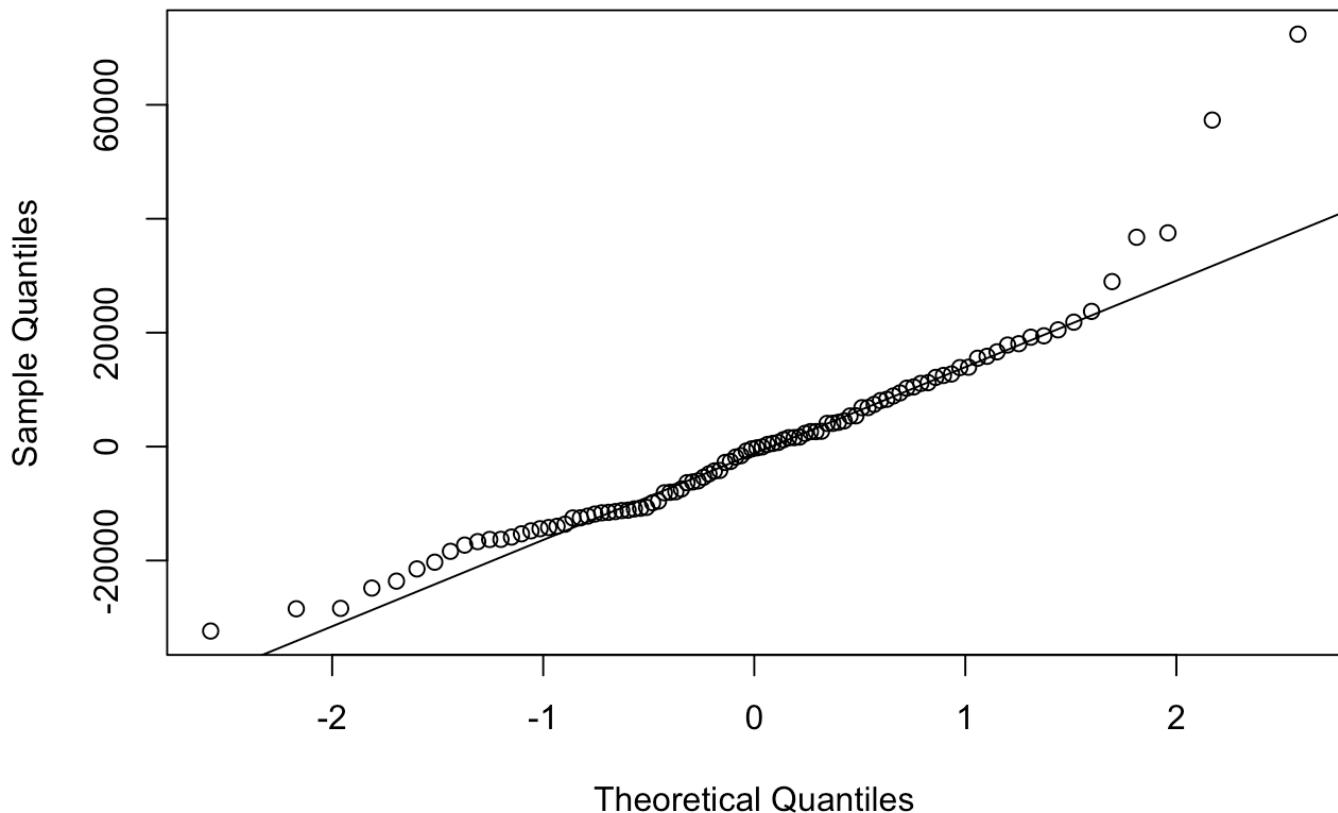
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

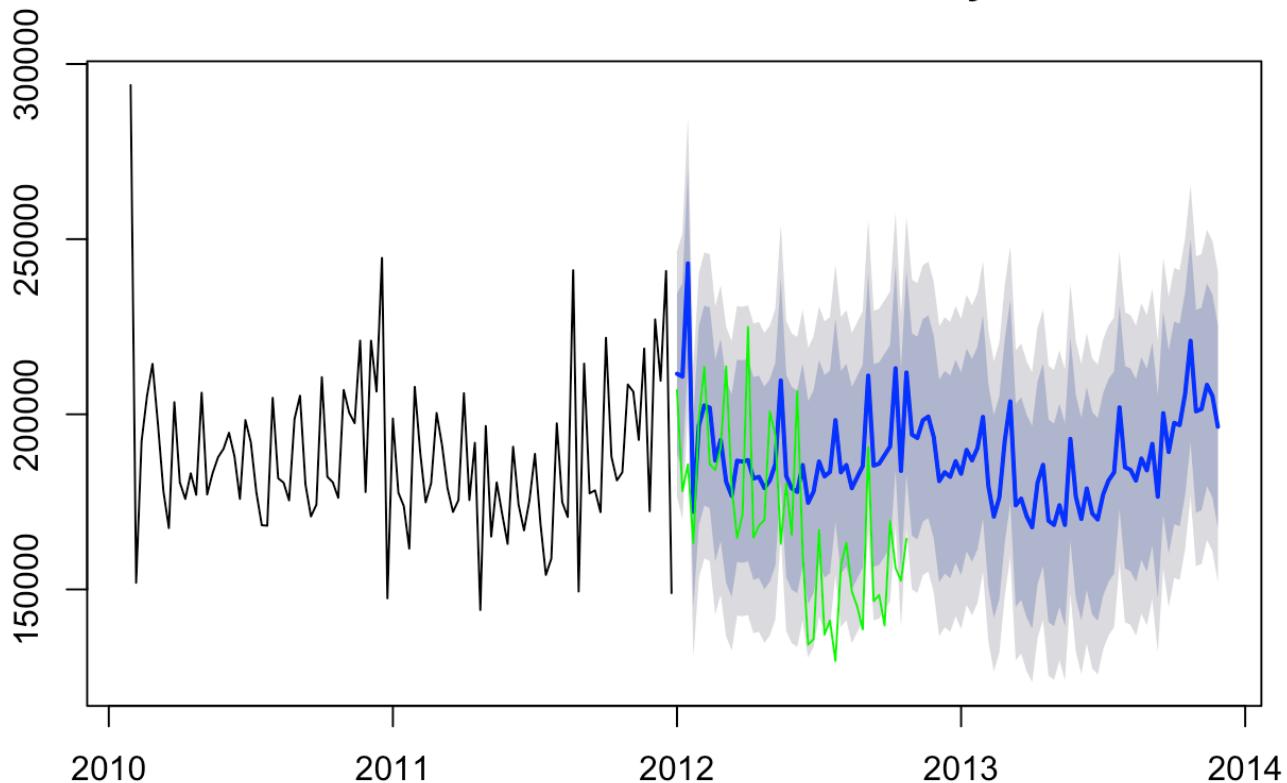

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



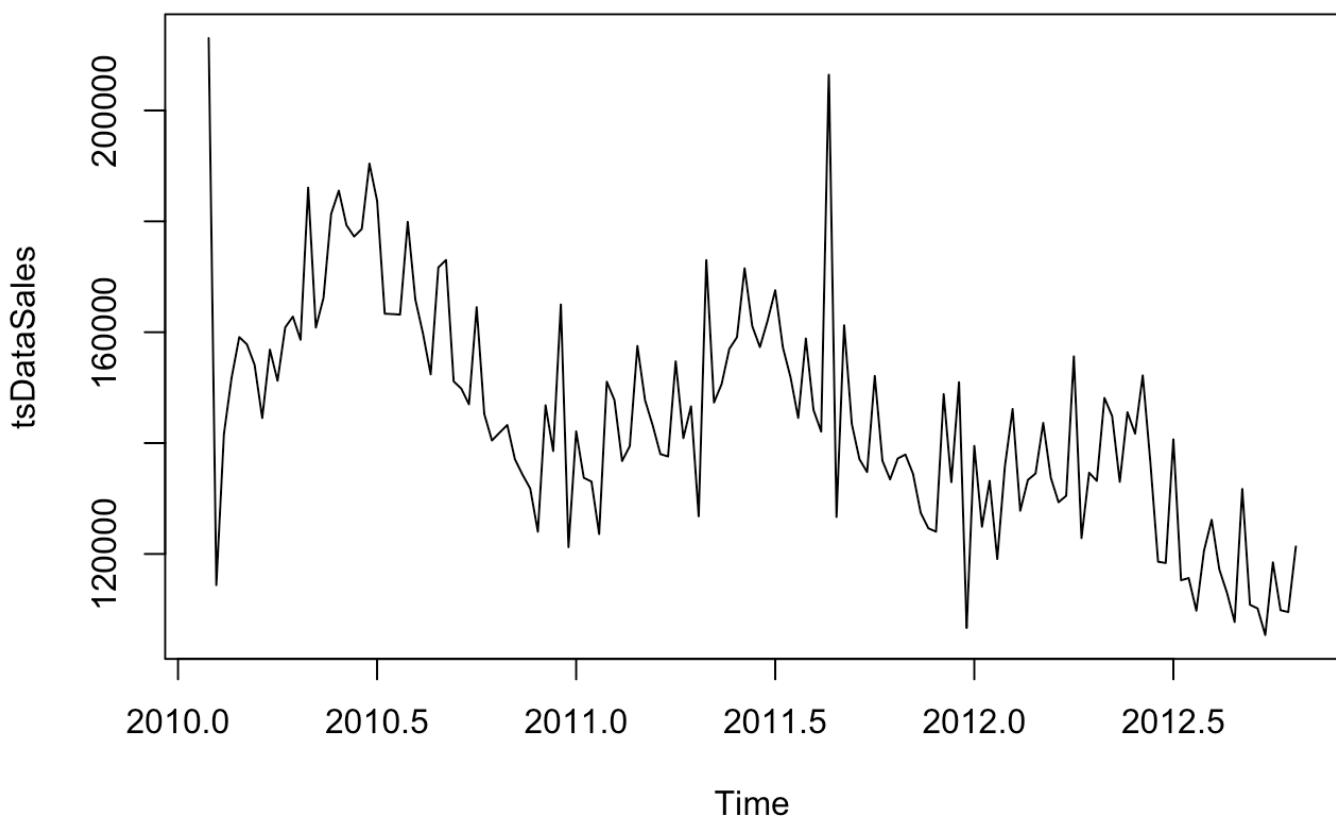
```

## [1] "16  out of  25  Completed"
## [1] "64 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  14 14 14 14 14 14 14 14 14 14 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday  : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept       : int  95 95 95 95 95 95 95 95 95 ...
## $ Weekly_Sales: num  213043 114381 141663 151818 159119 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int  200898 200898 200898 200898 200898 200898 200898 200898 200898 ...
## $ Temperature: num  27.3 27.7 31.3 34.9 37.1 ...
## $ Fuel_Price : num  2.78 2.77 2.75 2.75 2.78 ...
## $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num  182 182 182 182 182 ...
## $ Unemployment: num  8.99 8.99 8.99 8.99 8.99 ...
##
## 
## iter imp variable

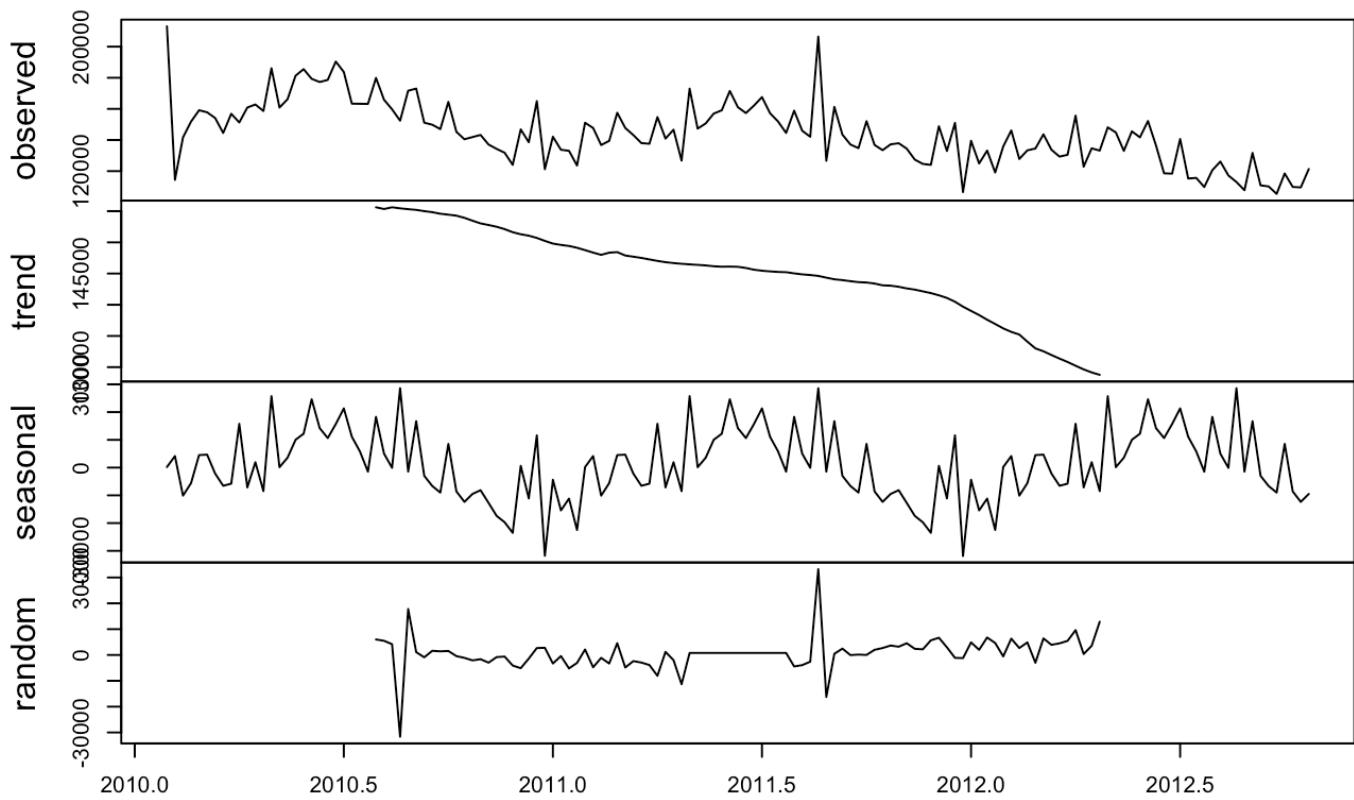
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

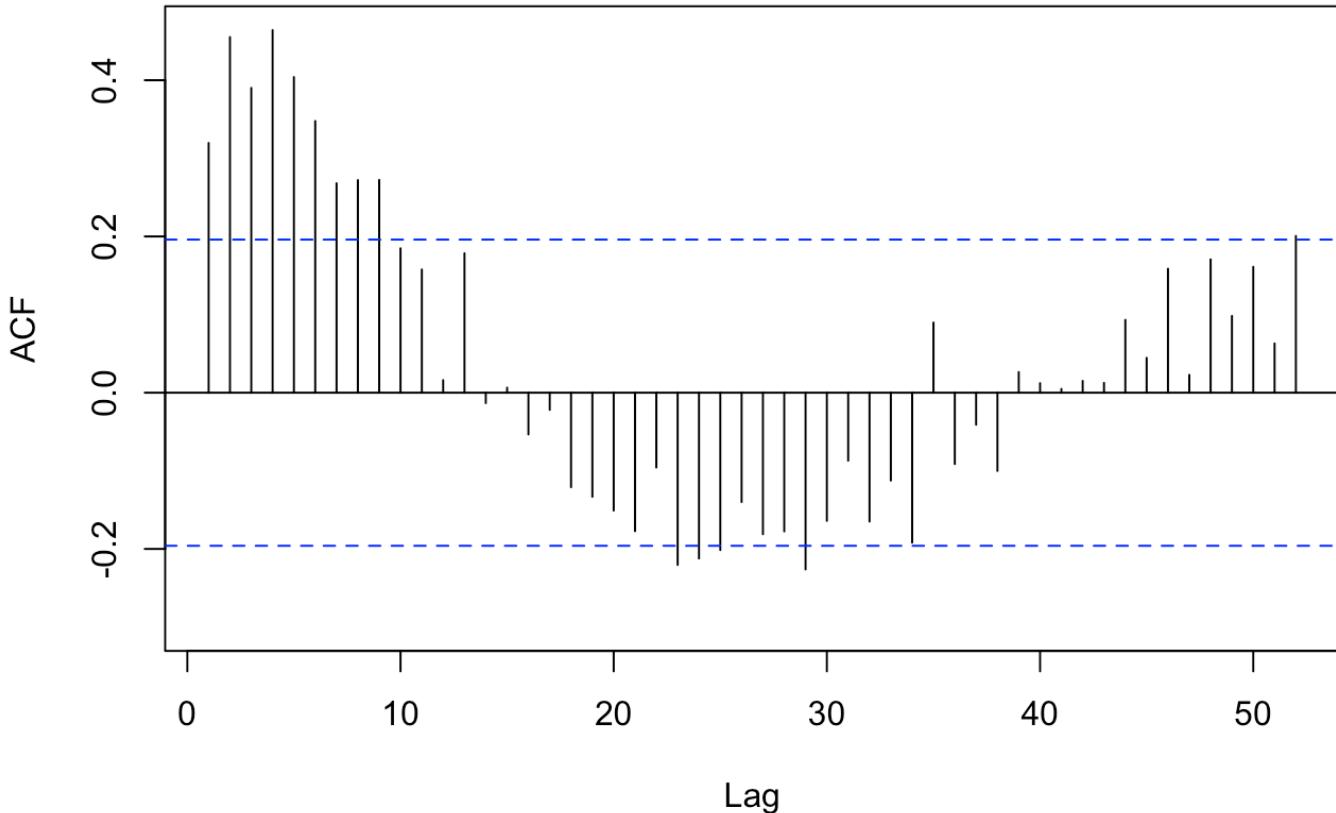
```
## [1] "Showing the results of store = 14 department = 95"
```



Decomposition of additive time series



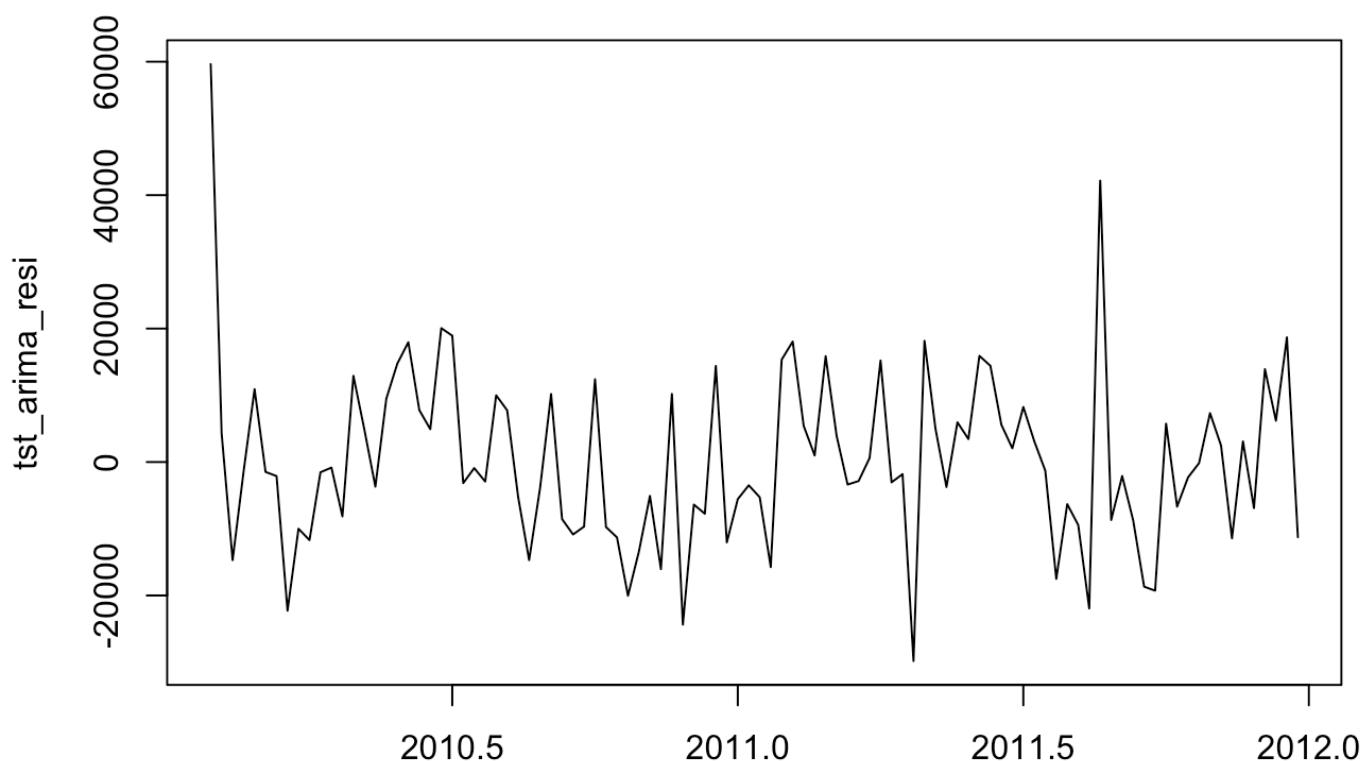
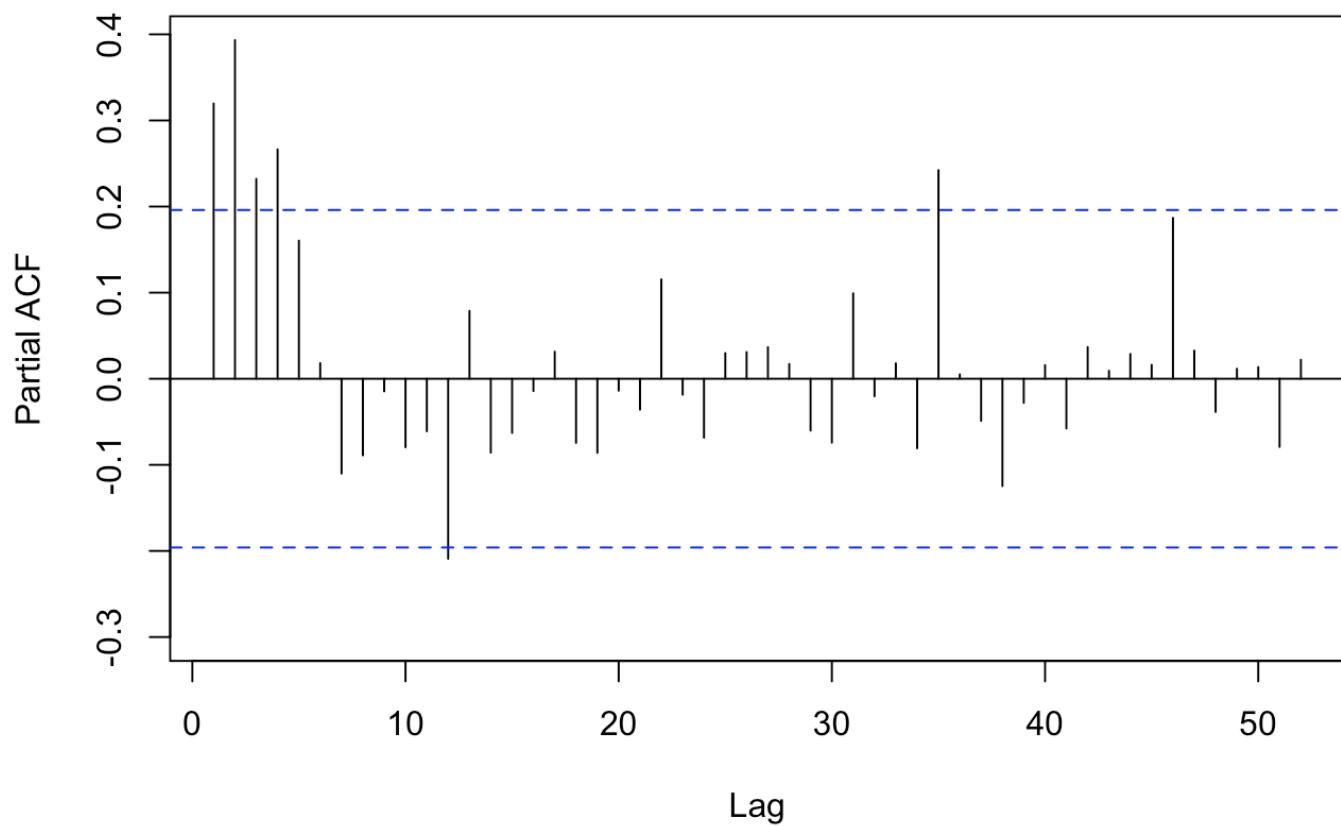
Time

Series train_sales

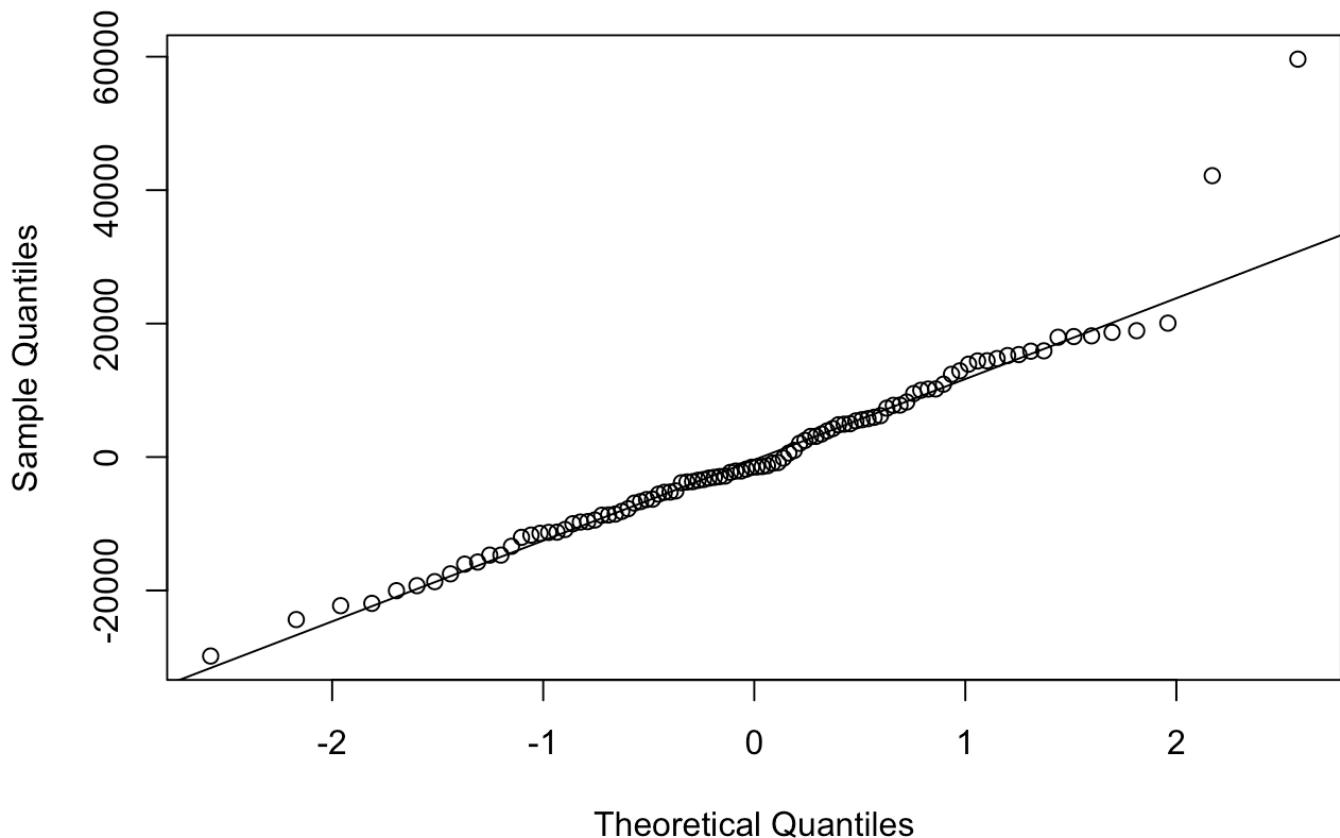
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

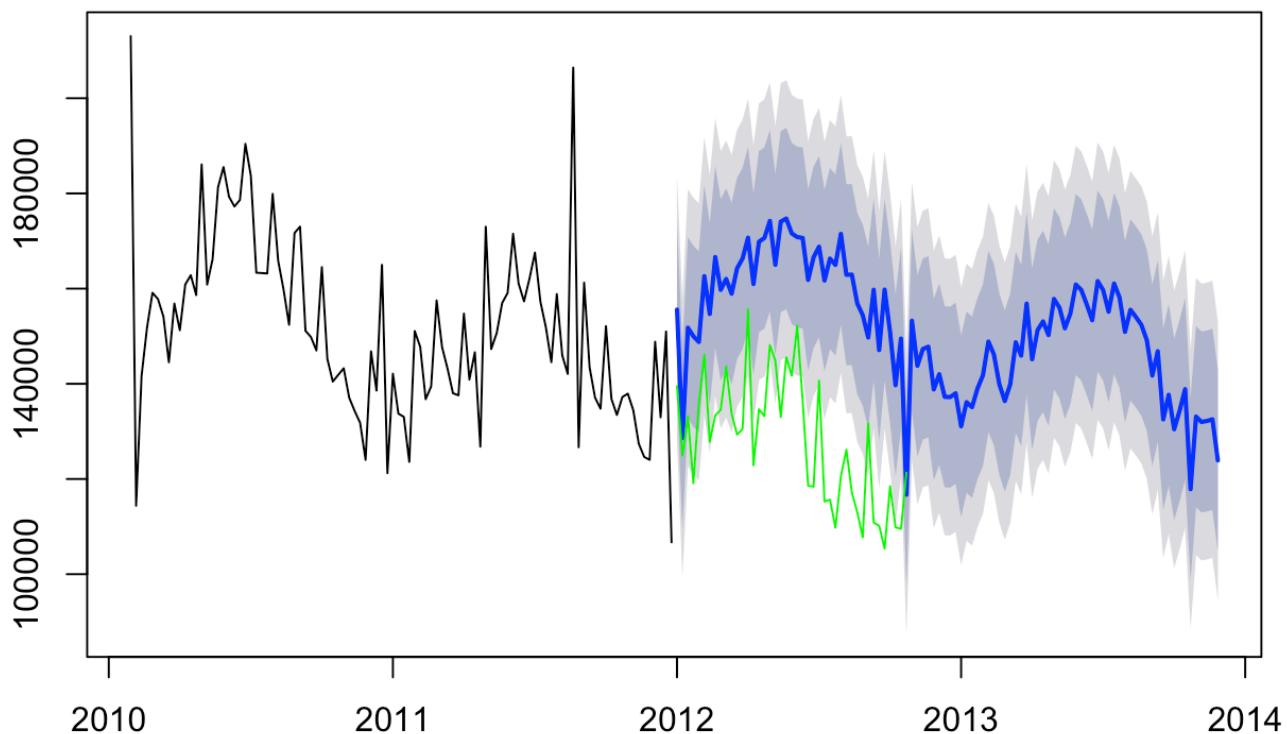

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



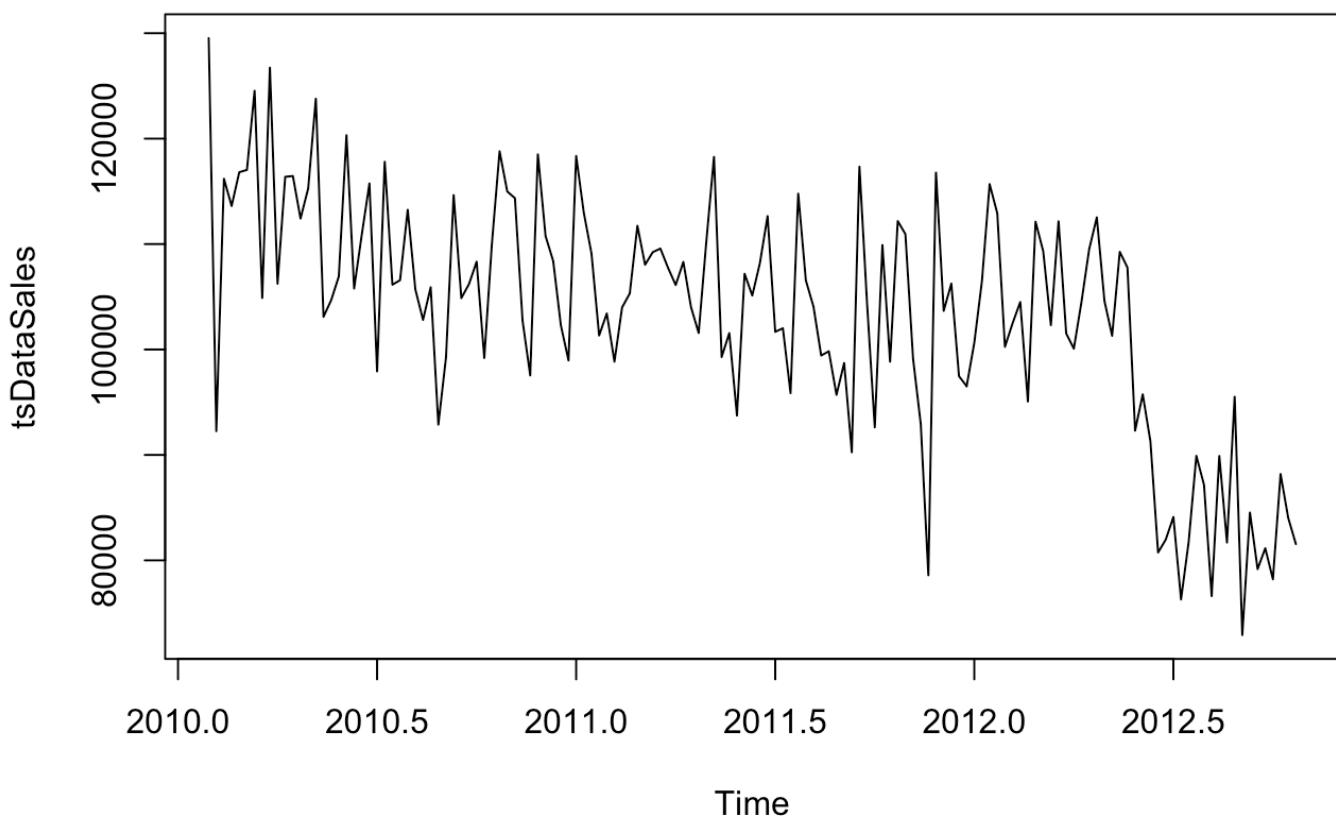
```

## [1] "17  out of  25  Completed"
## [1] "68 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  14 14 14 14 14 14 14 14 14 14 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  129531 92253 116192 113613 116817 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  200898 200898 200898 200898 200898 200898 200898 ...
##   $ Temperature: num  27.3 27.7 31.3 34.9 37.1 ...
##   $ Fuel_Price  : num  2.78 2.77 2.75 2.75 2.78 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  182 182 182 182 182 ...
##   $ Unemployment: num  8.99 8.99 8.99 8.99 8.99 ...
##
## 
## iter imp variable

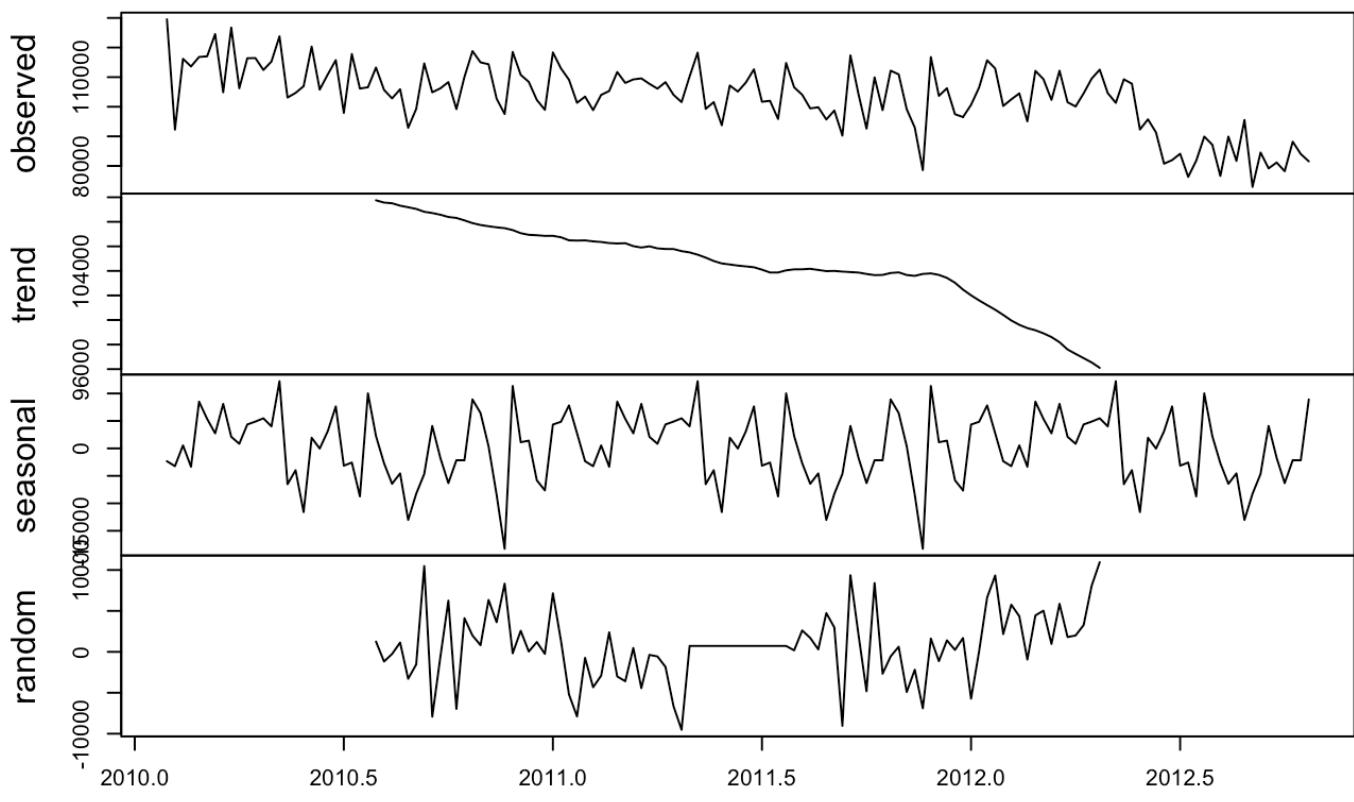
```

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## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

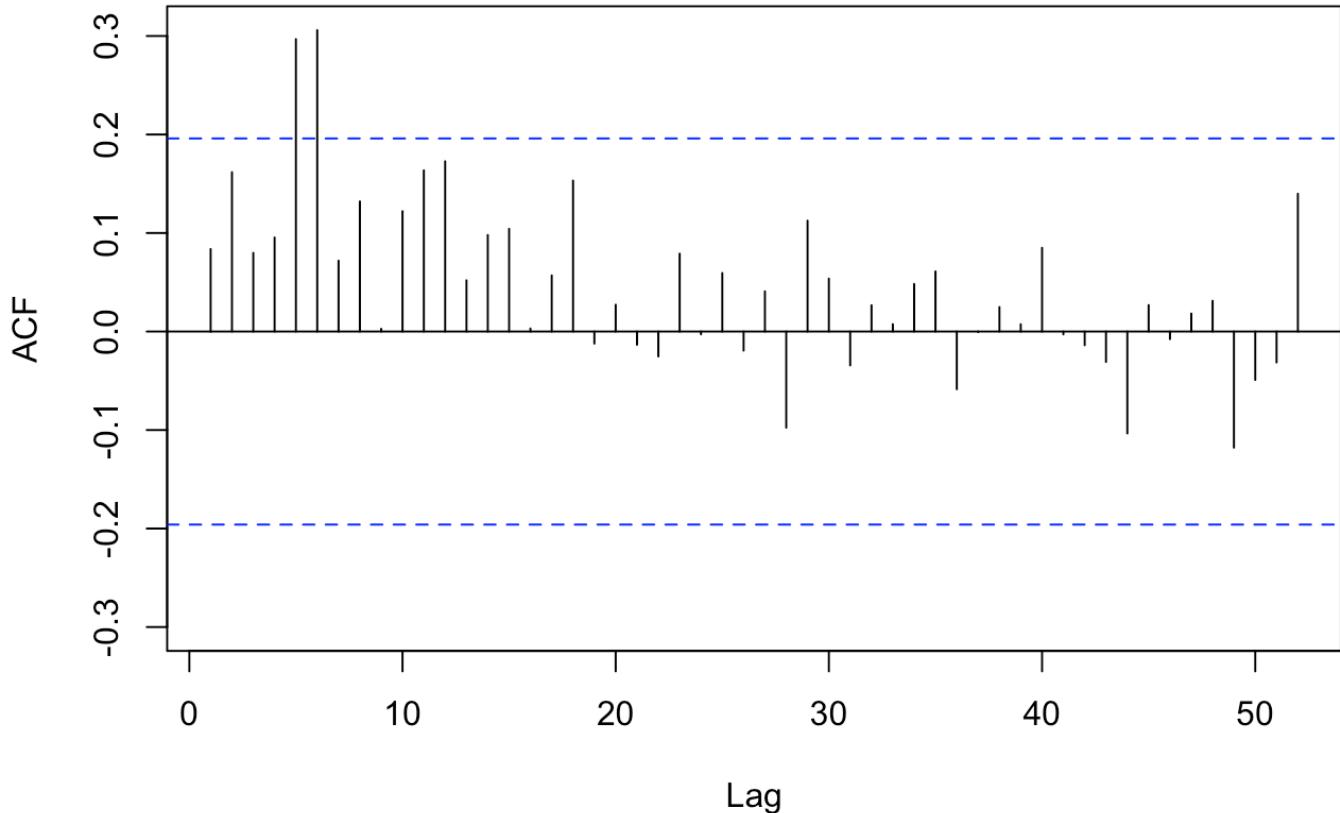
```
## [1] "Showing the results of store = 14 department = 38"
```



Decomposition of additive time series



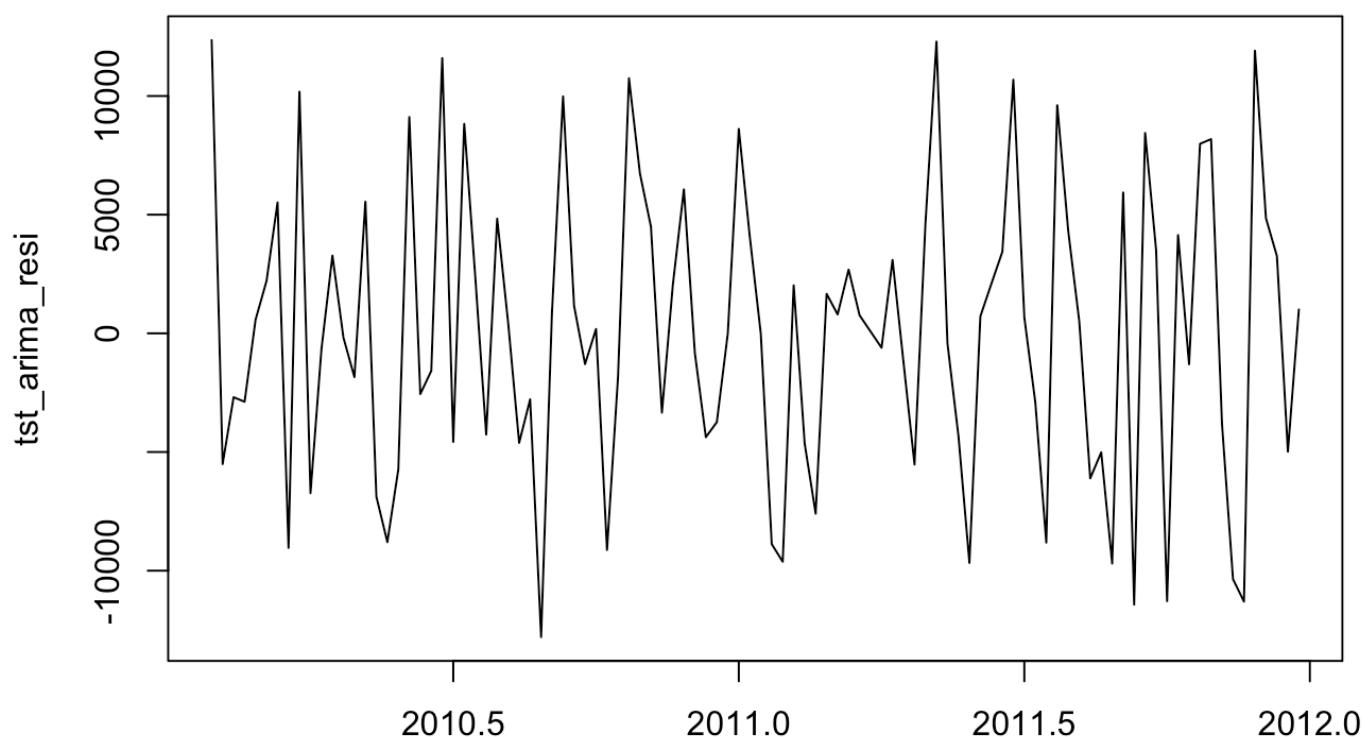
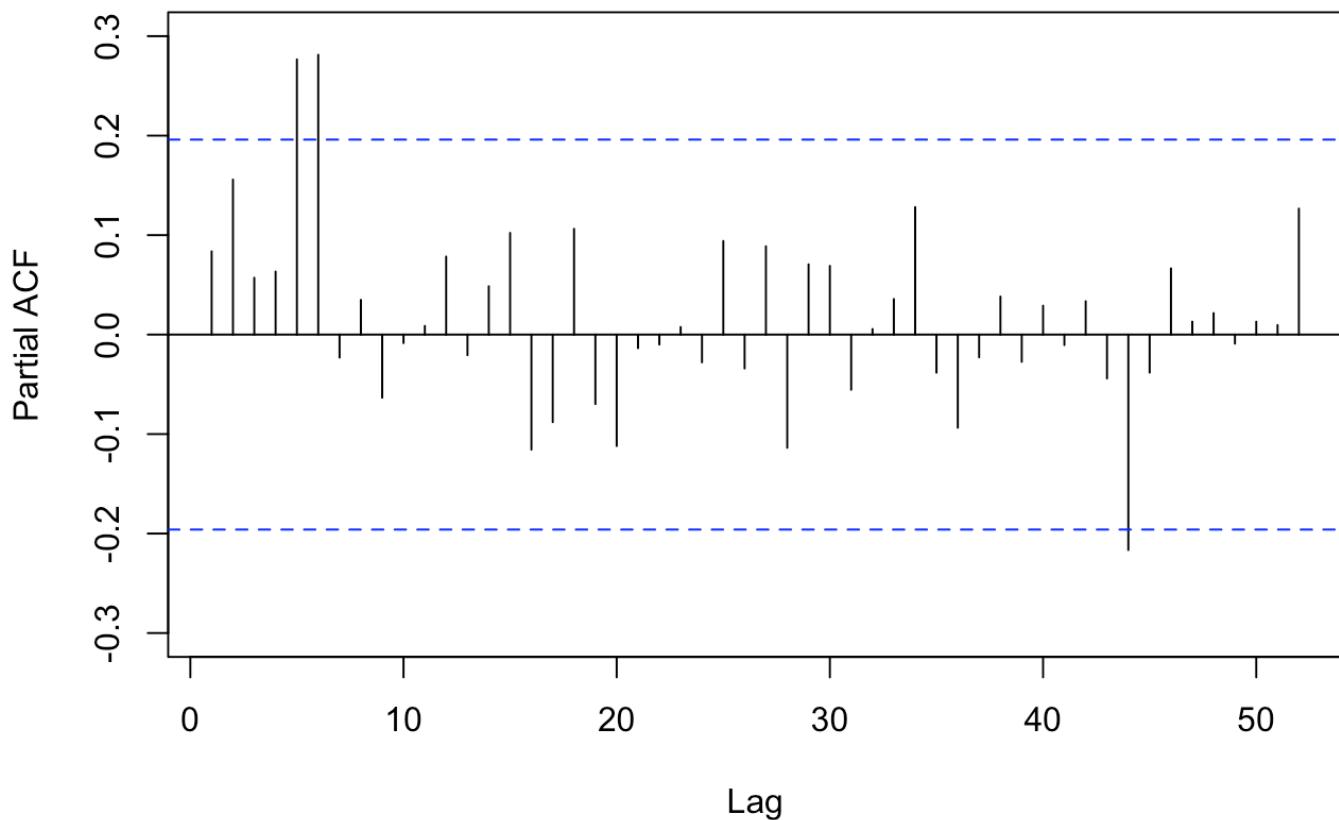
Time

Series train_sales

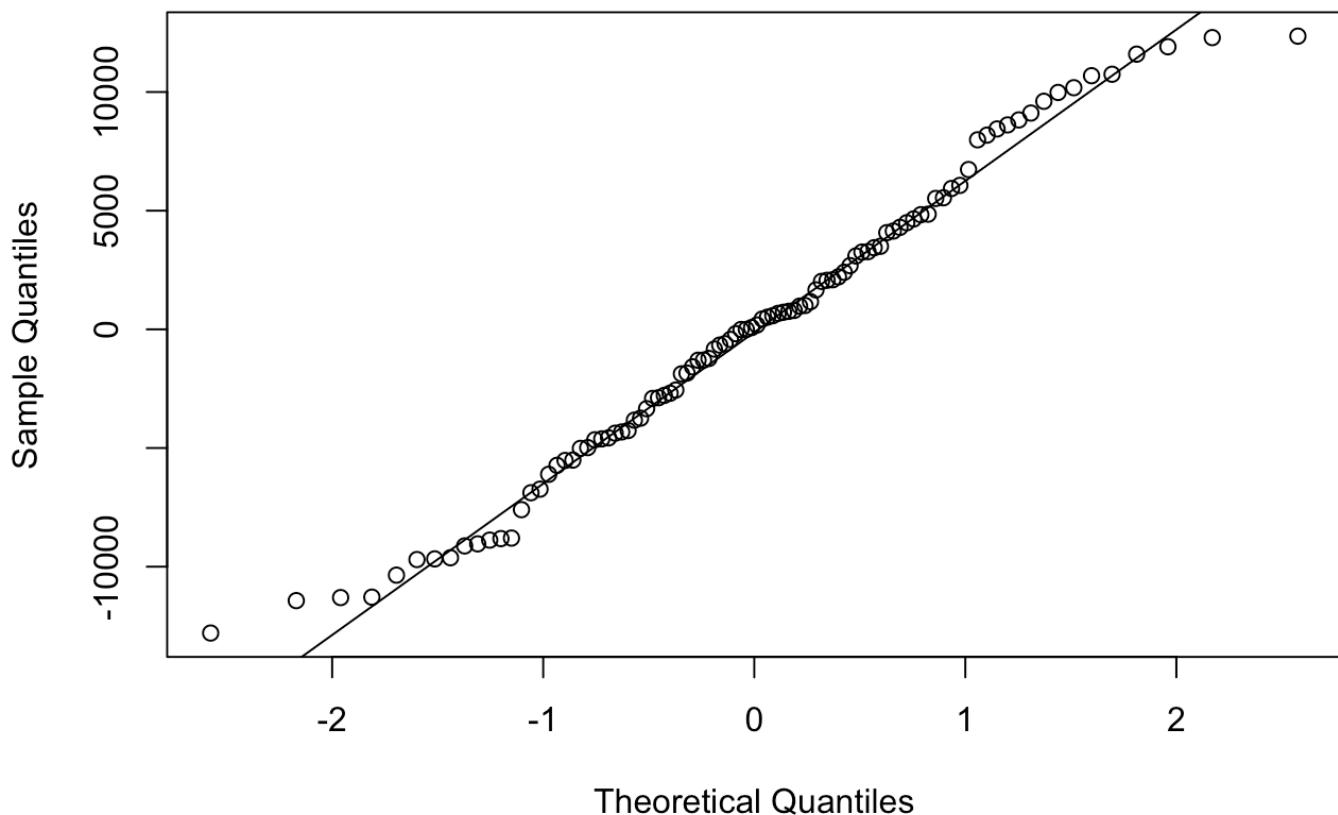
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

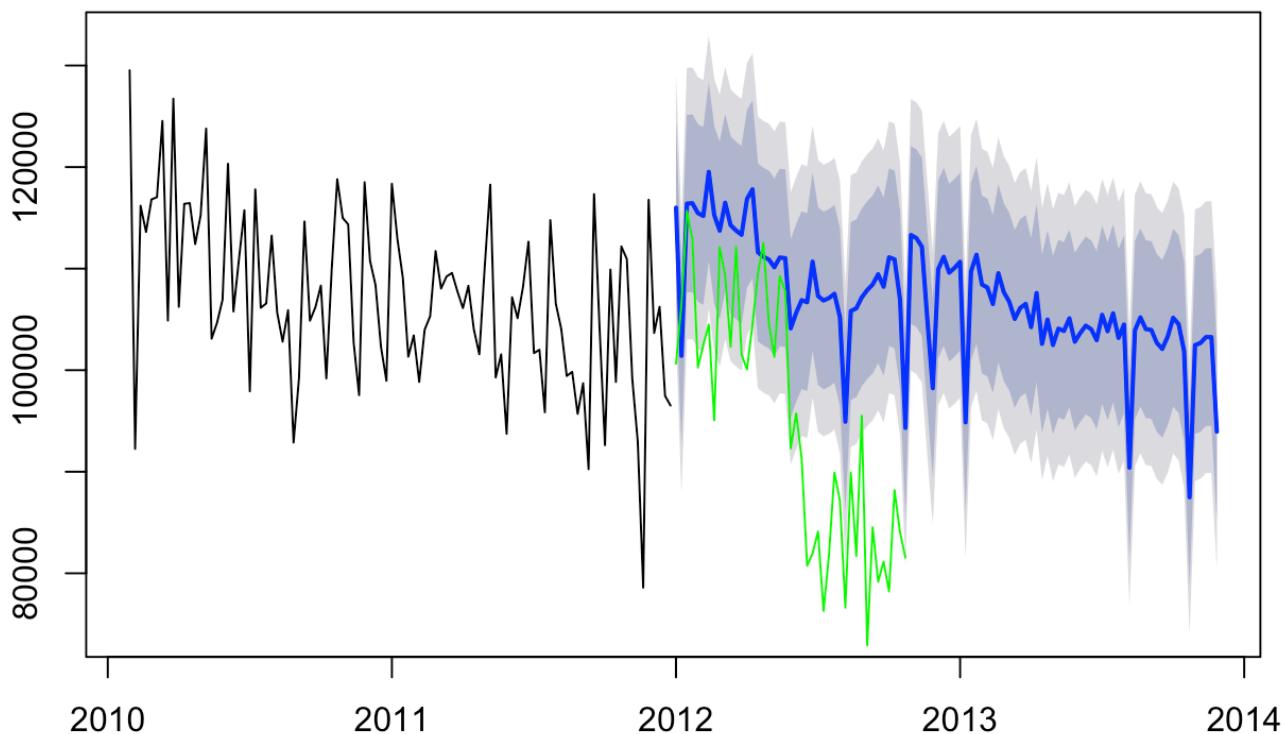

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



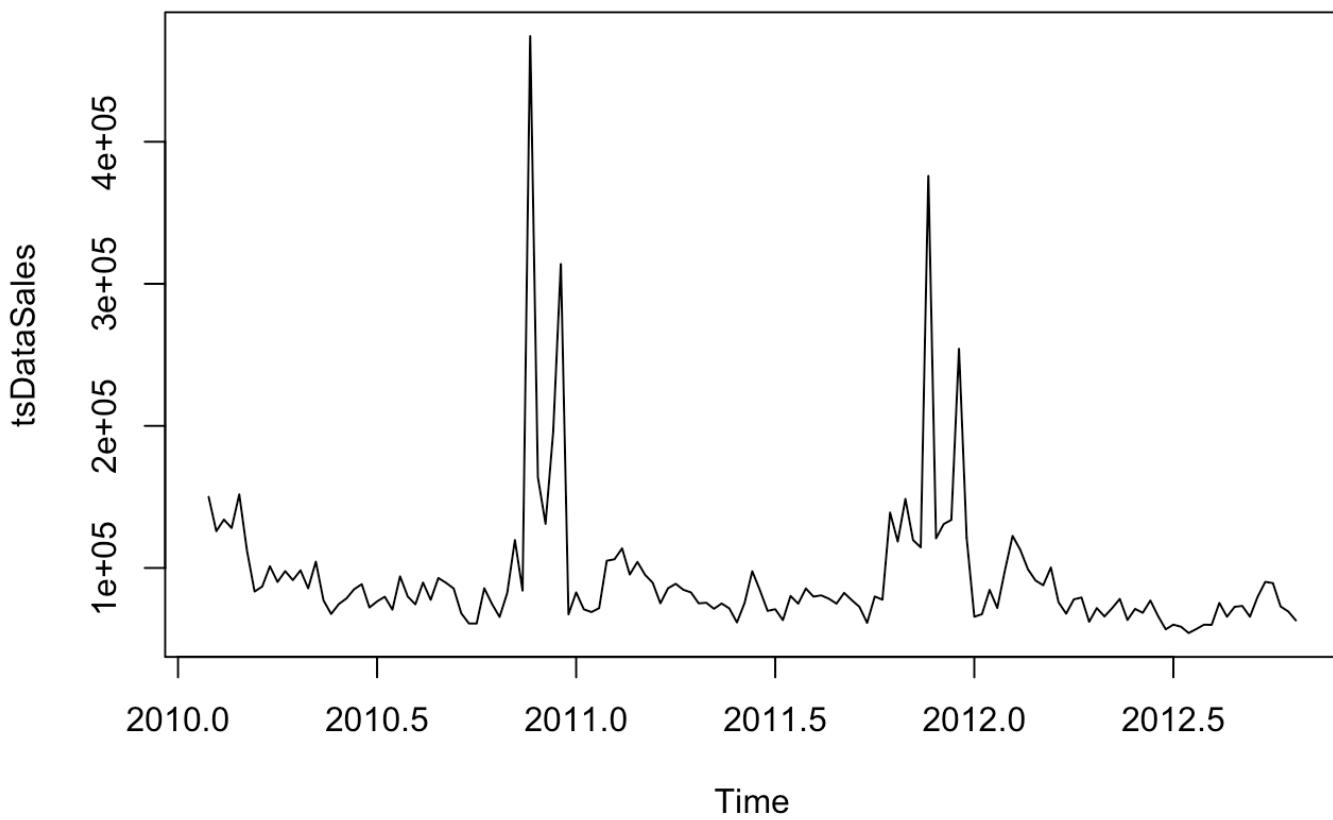
```

## [1] "18  out of  25  Completed"
## [1] "72 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  14 14 14 14 14 14 14 14 14 14 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday  : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept       : int  72 72 72 72 72 72 72 72 72 ...
## $ Weekly_Sales: num  150038 125890 134042 128110 151791 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int  200898 200898 200898 200898 200898 200898 200898 200898 200898 ...
## $ Temperature: num  27.3 27.7 31.3 34.9 37.1 ...
## $ Fuel_Price : num  2.78 2.77 2.75 2.75 2.78 ...
## $ Markdown1  : num  NA NA NA NA NA NA NA NA NA ...
## $ Markdown2  : num  NA NA NA NA NA NA NA NA NA ...
## $ Markdown3  : num  NA NA NA NA NA NA NA NA NA ...
## $ Markdown4  : num  NA NA NA NA NA NA NA NA NA ...
## $ Markdown5  : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num  182 182 182 182 182 ...
## $ Unemployment: num  8.99 8.99 8.99 8.99 8.99 ...
##
## iter imp variable

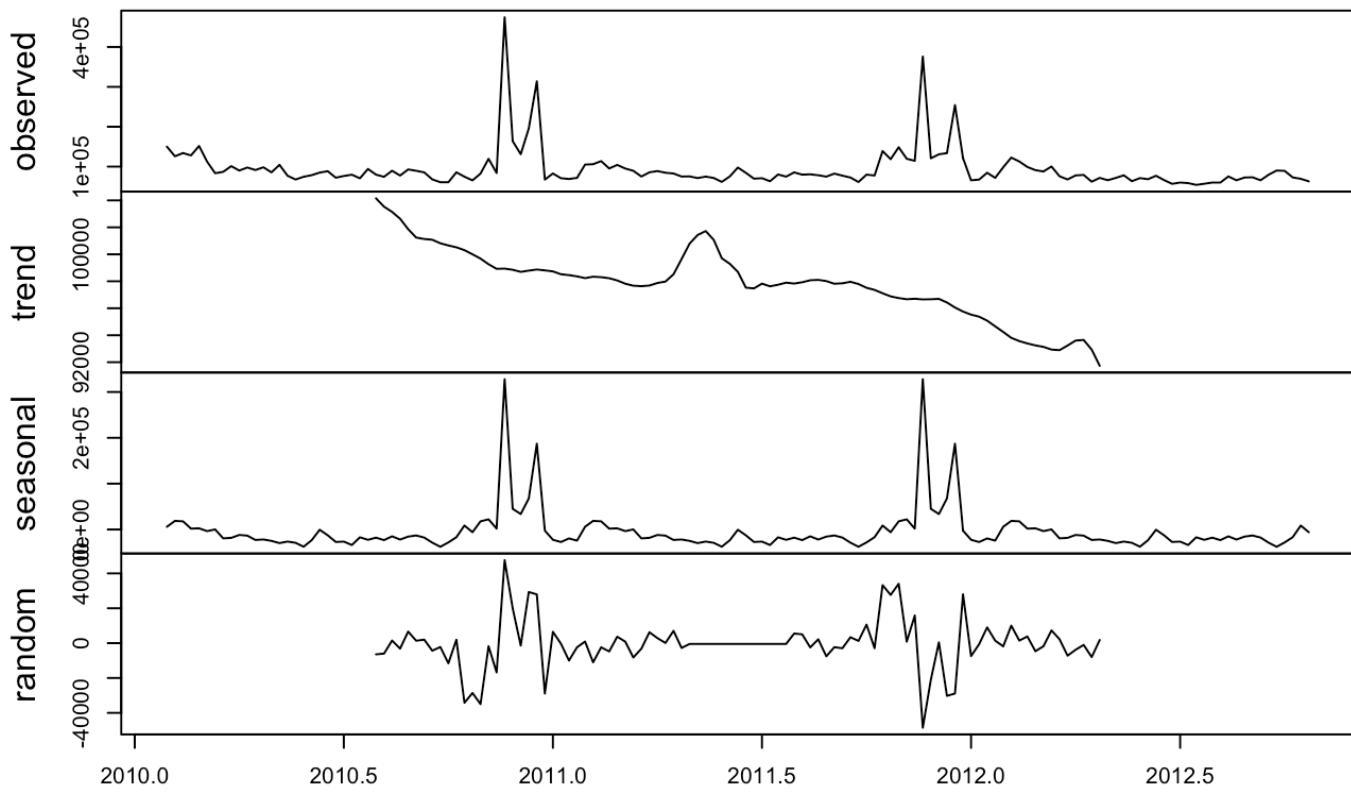
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

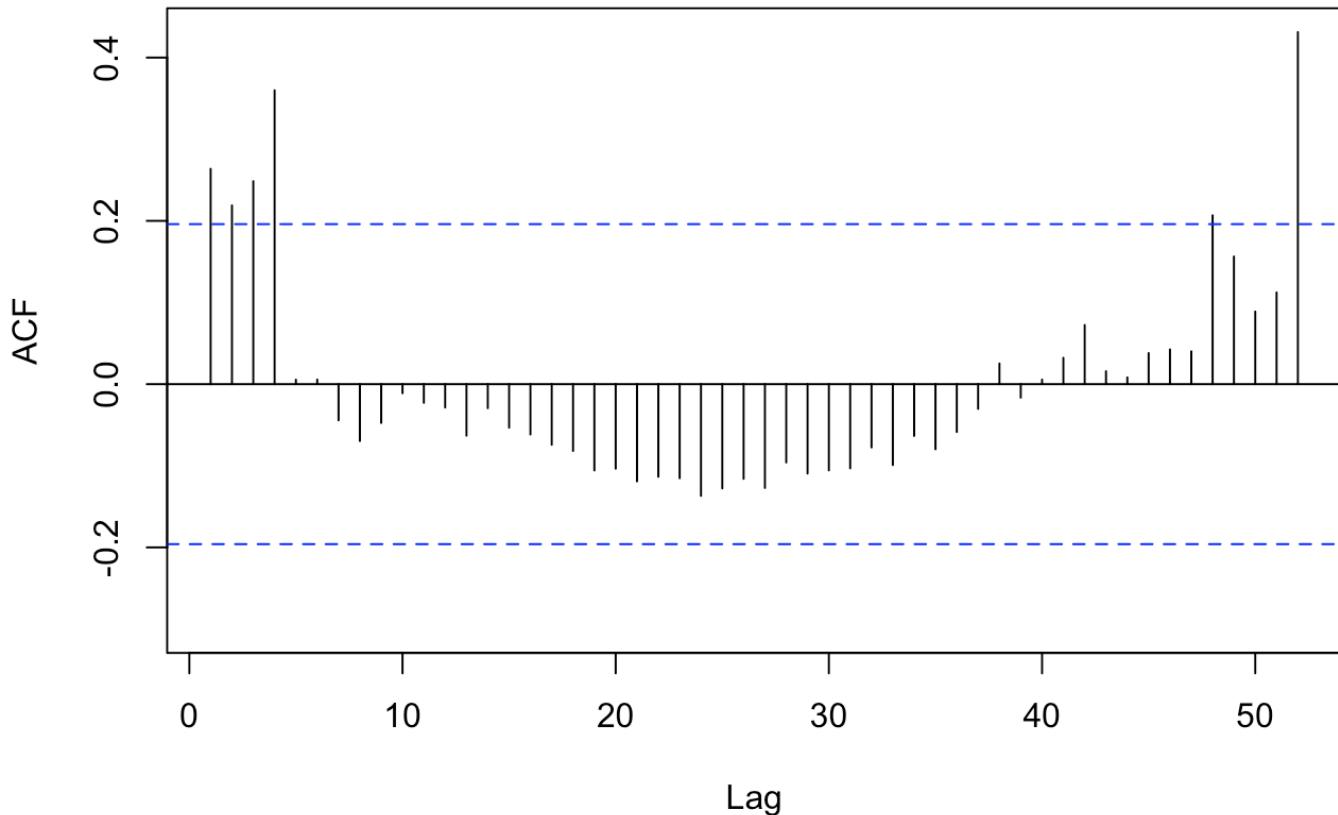
```
## [1] "Showing the results of store = 14 department = 72"
```



Decomposition of additive time series



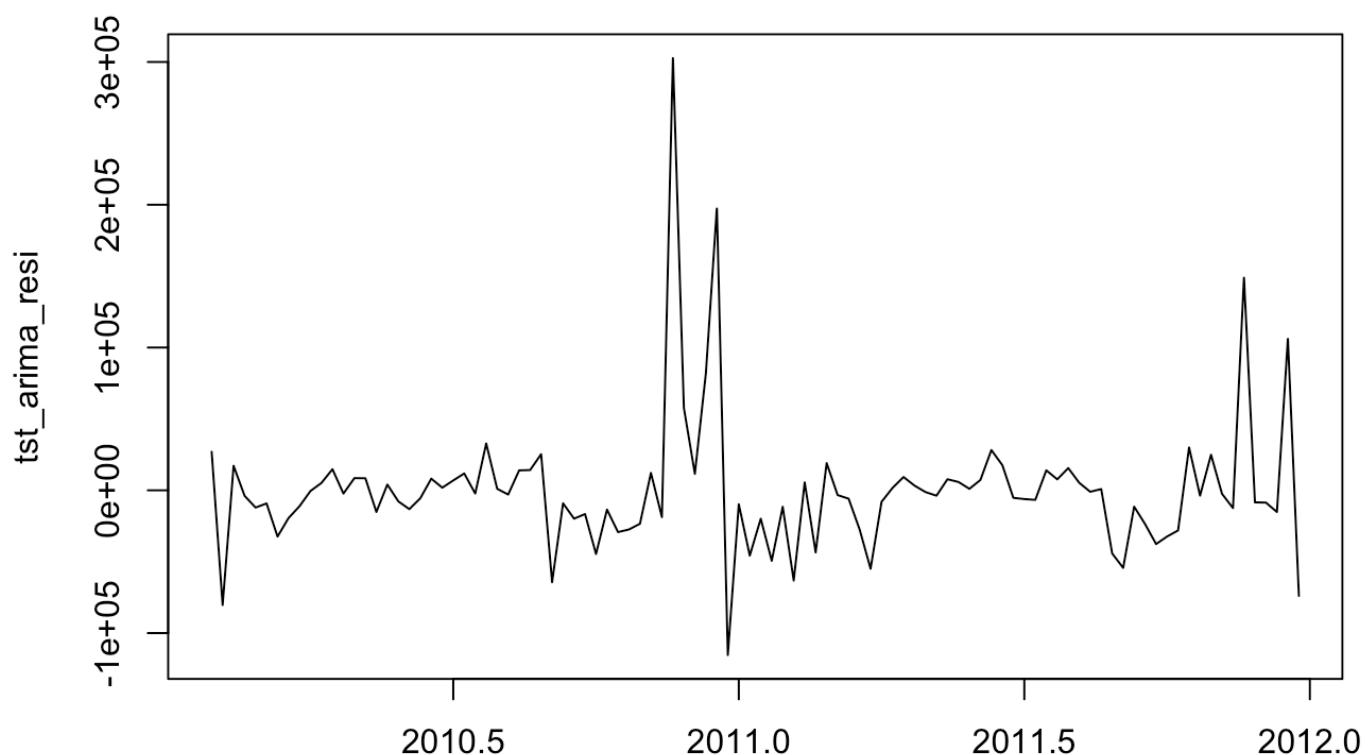
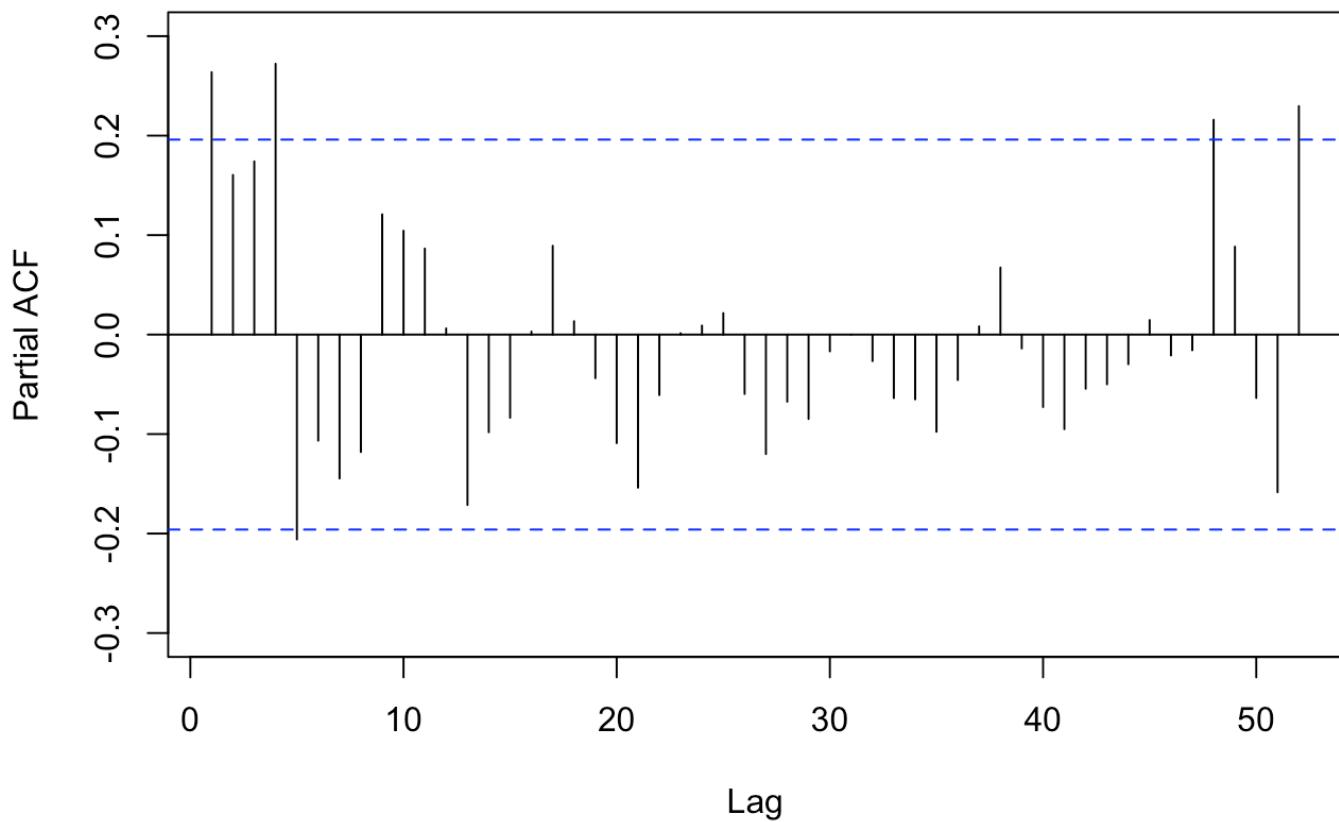
Time

Series train_sales

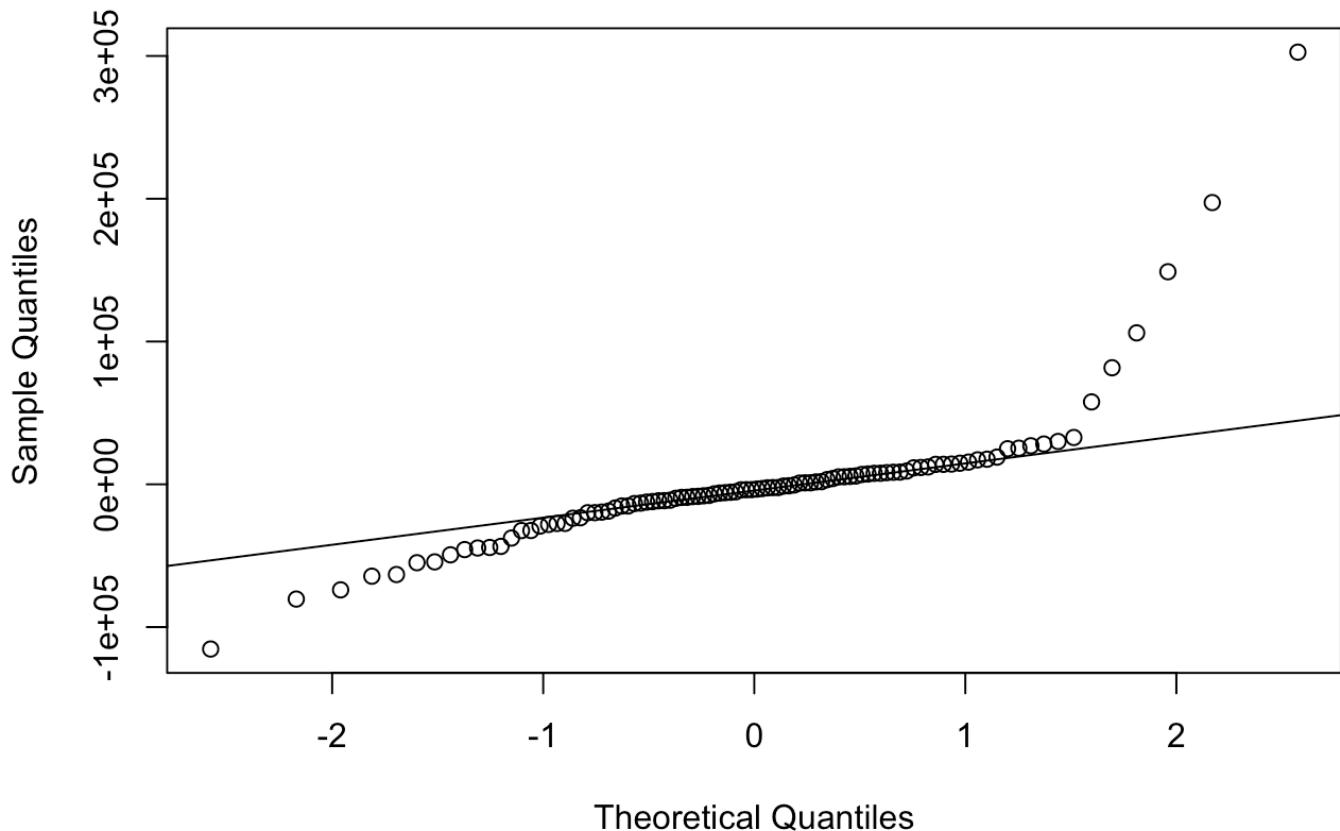
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

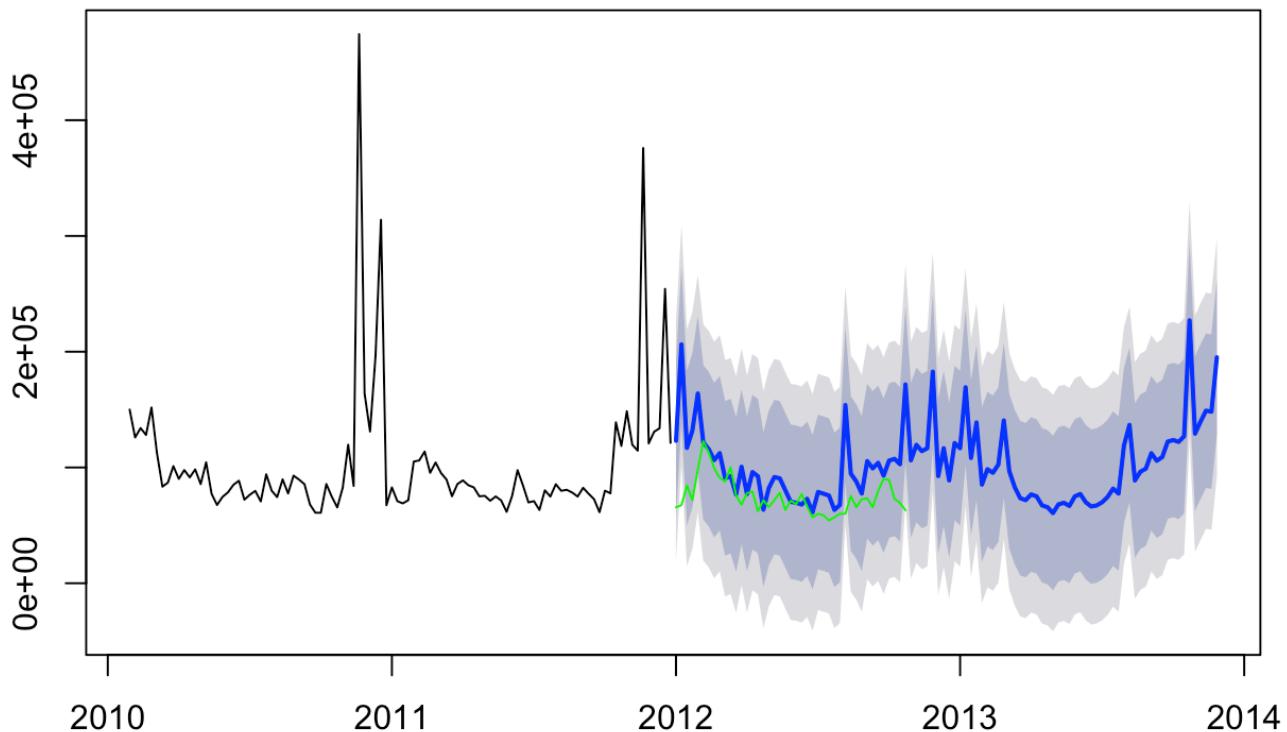

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



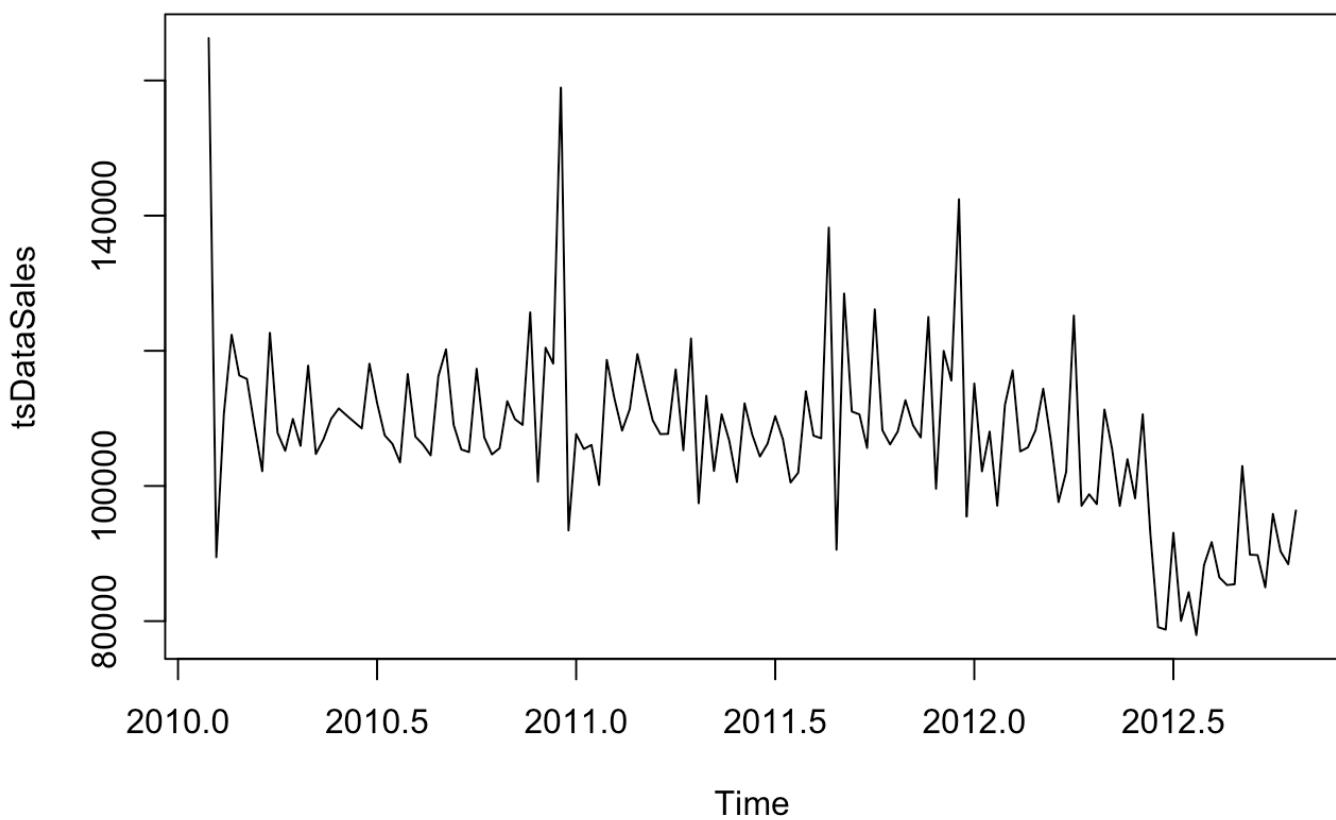
```

## [1] "19  out of  25  Completed"
## [1] "76 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  14 14 14 14 14 14 14 14 14 14 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  166264 89460 110791 122369 116357 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  200898 200898 200898 200898 200898 200898 200898 ...
##   $ Temperature: num  27.3 27.7 31.3 34.9 37.1 ...
##   $ Fuel_Price  : num  2.78 2.77 2.75 2.75 2.78 ...
##   $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5   : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI         : num  182 182 182 182 182 ...
##   $ Unemployment: num  8.99 8.99 8.99 8.99 8.99 ...
##
## 
## iter imp variable

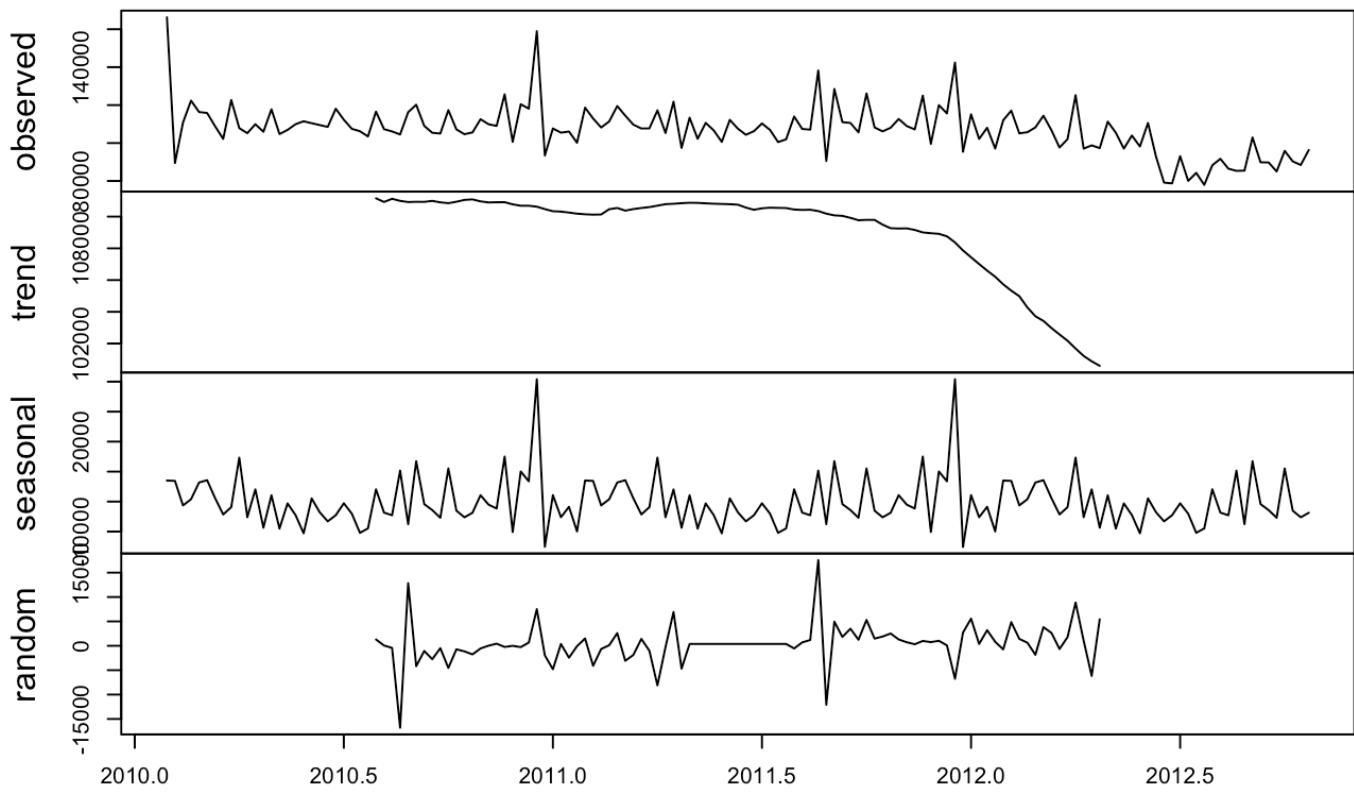
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

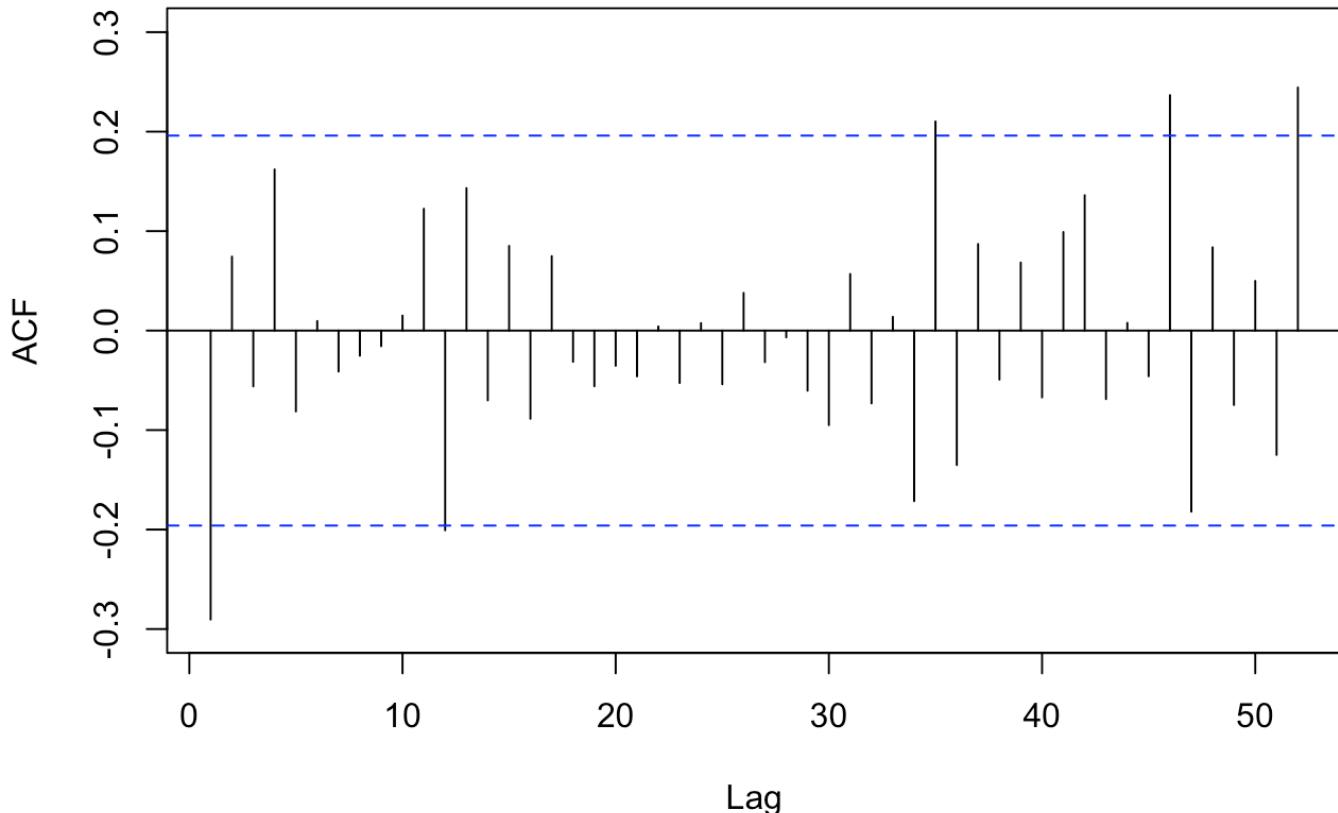
```
## [1] "Showing the results of store = 14 department = 90"
```



Decomposition of additive time series



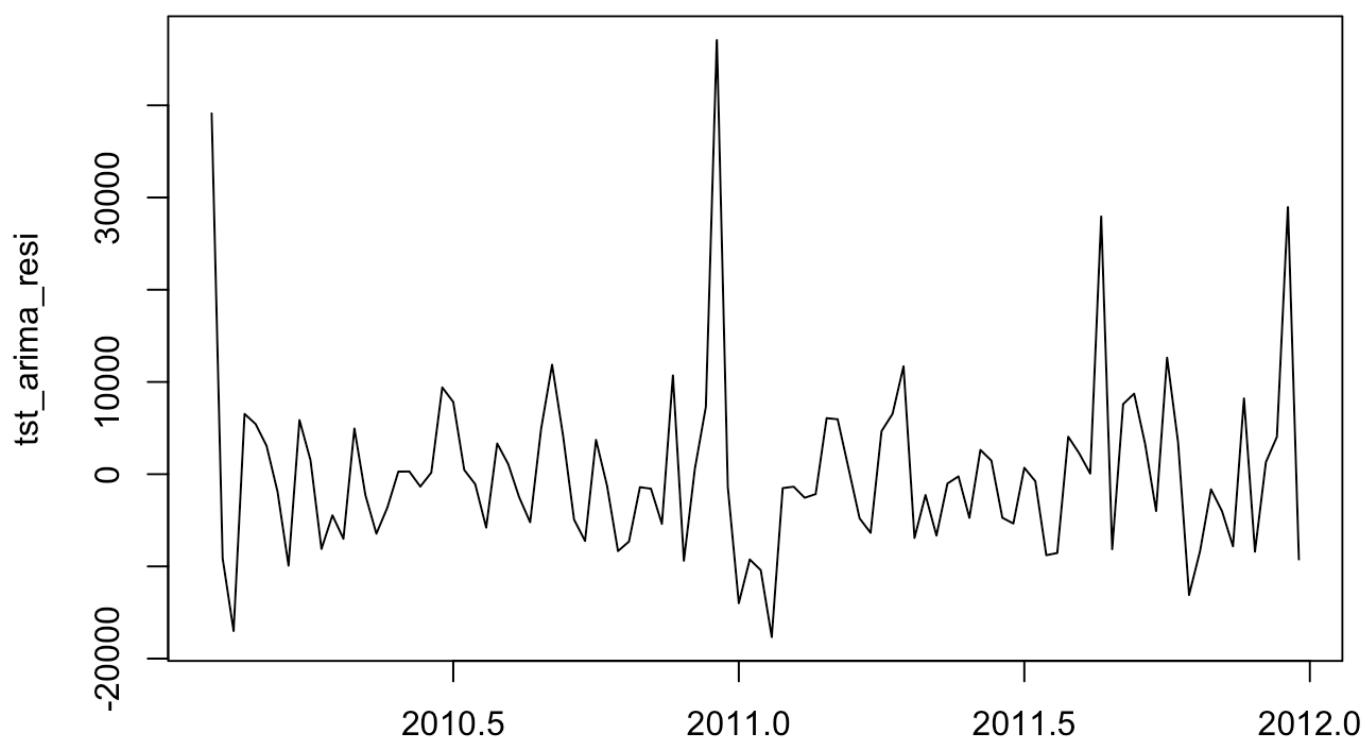
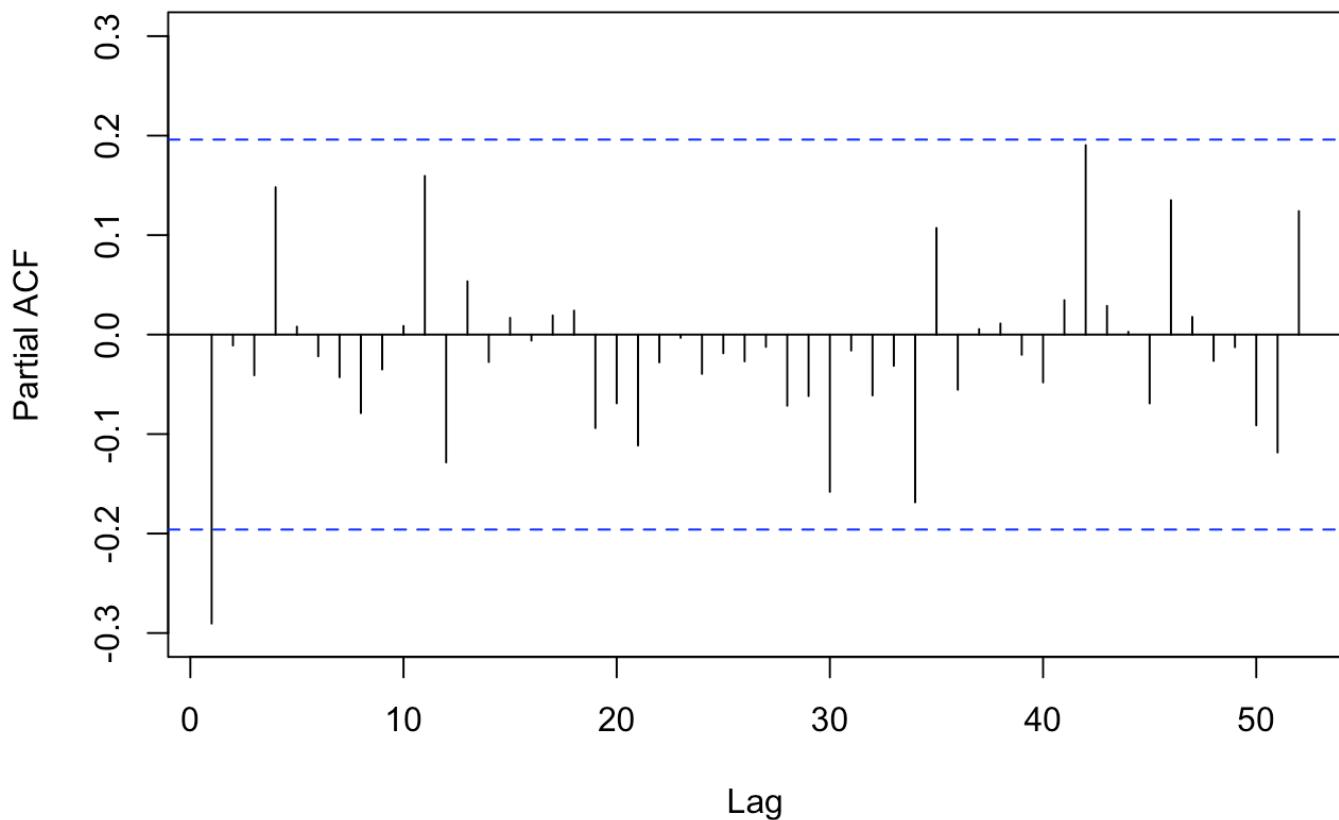
Time

Series train_sales

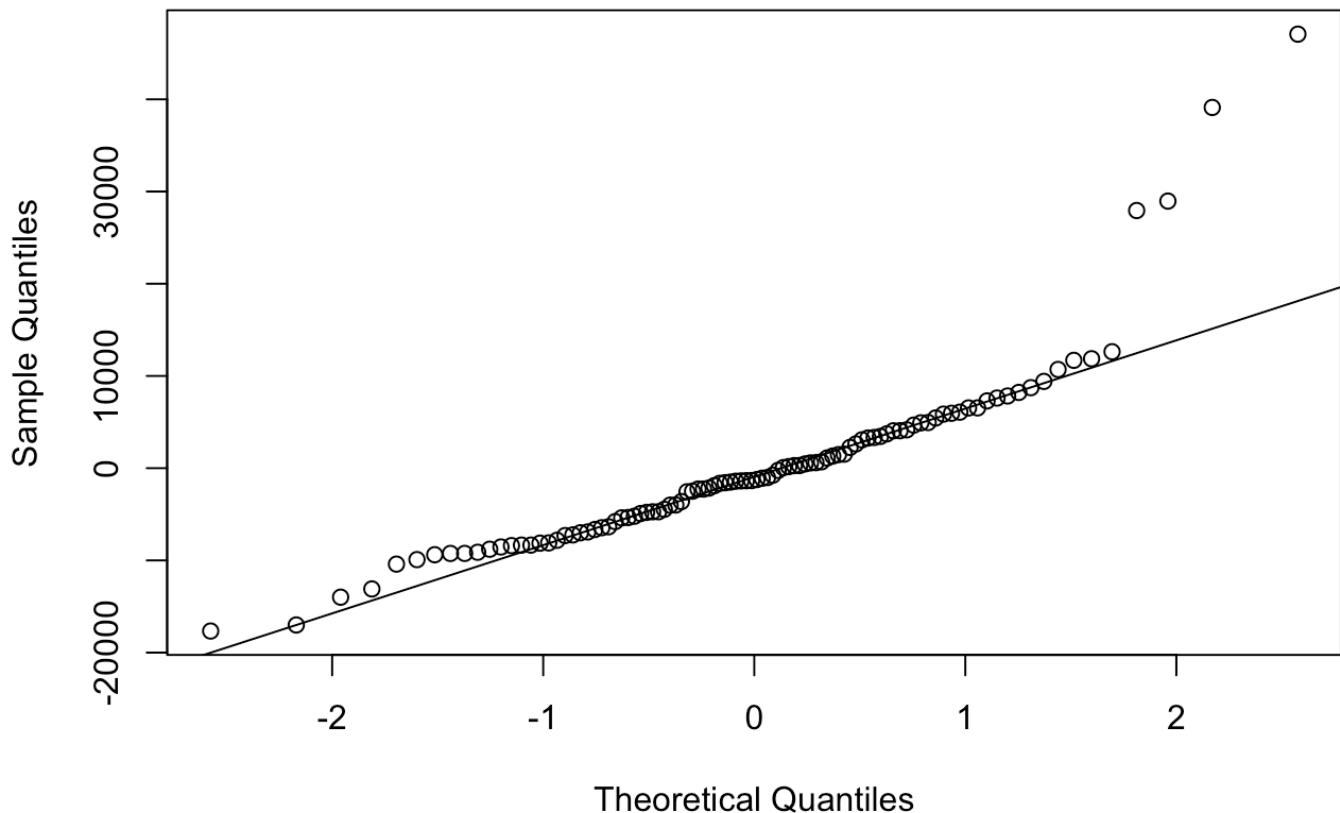
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

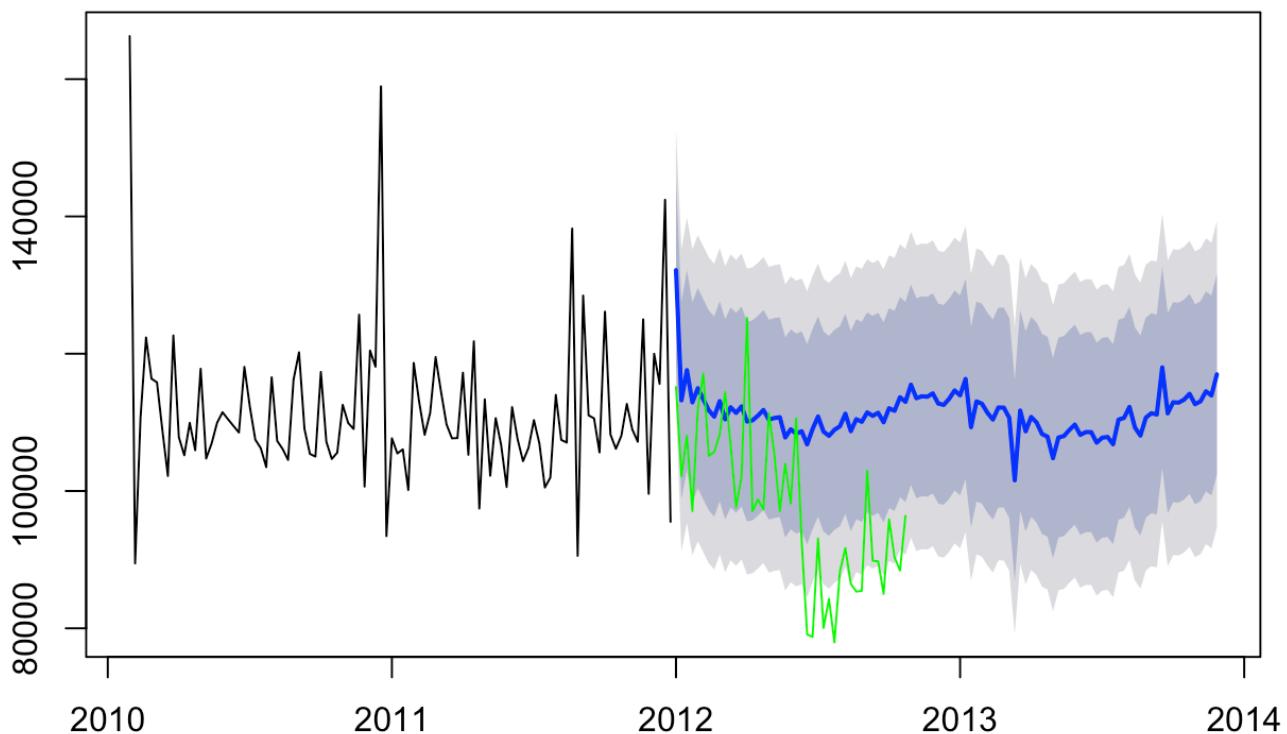

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



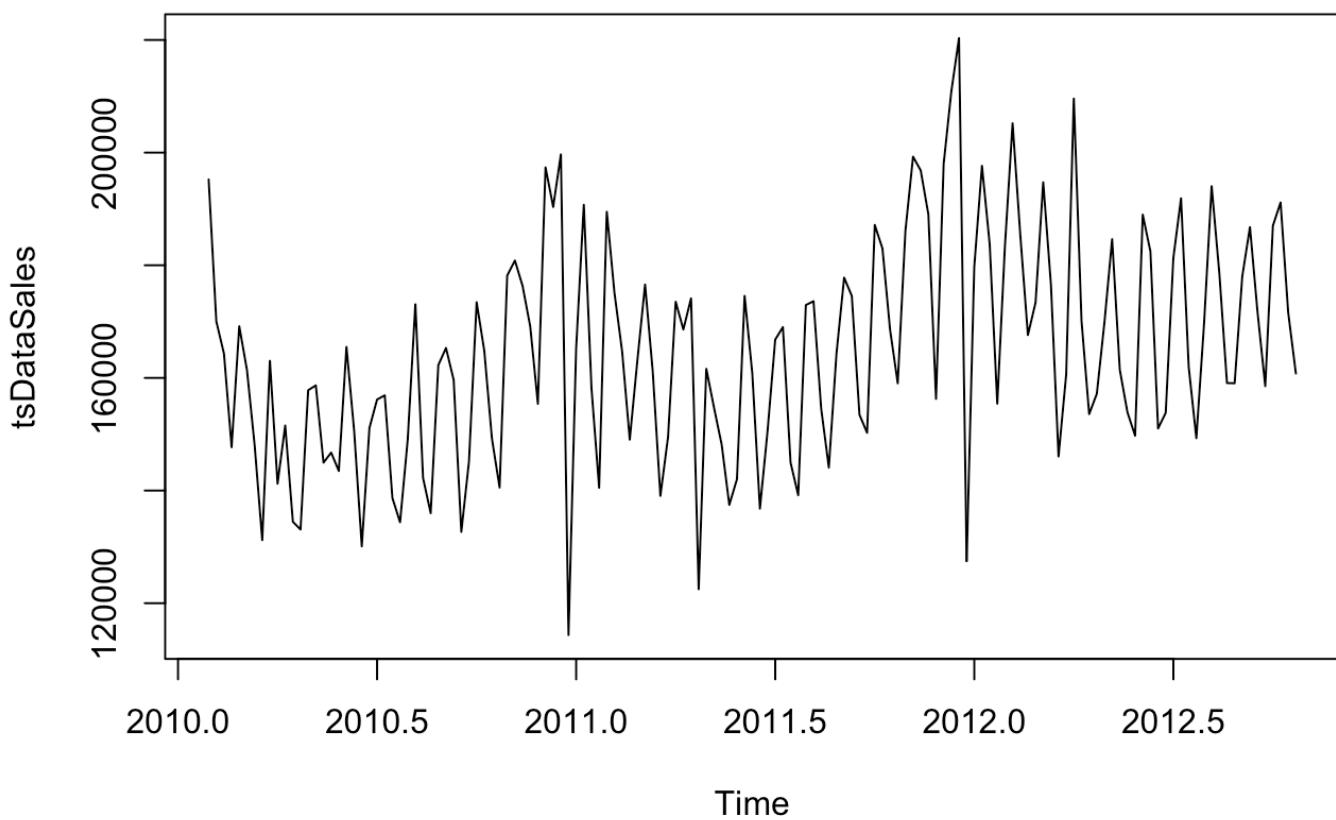
```

## [1] "20  out of  25  Completed"
## [1] "80 % Completed"
## 'data.frame':   143 obs. of  16 variables:
## $ Store      : int  20 20 20 20 20 20 20 20 20 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
## $ Weekly_Sales: num  195224 170044 164314 147700 169171 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int  203742 203742 203742 203742 203742 203742 203742 203742 ...
## $ Temperature: num  25.9 22.1 25.4 32.3 31.8 ...
## $ Fuel_Price  : num  2.78 2.77 2.75 2.75 2.78 ...
## $ MarkDown1   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num  NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num  NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num  204 204 204 204 204 ...
## $ Unemployment: num  8.19 8.19 8.19 8.19 8.19 ...
##
## 
## iter imp variable

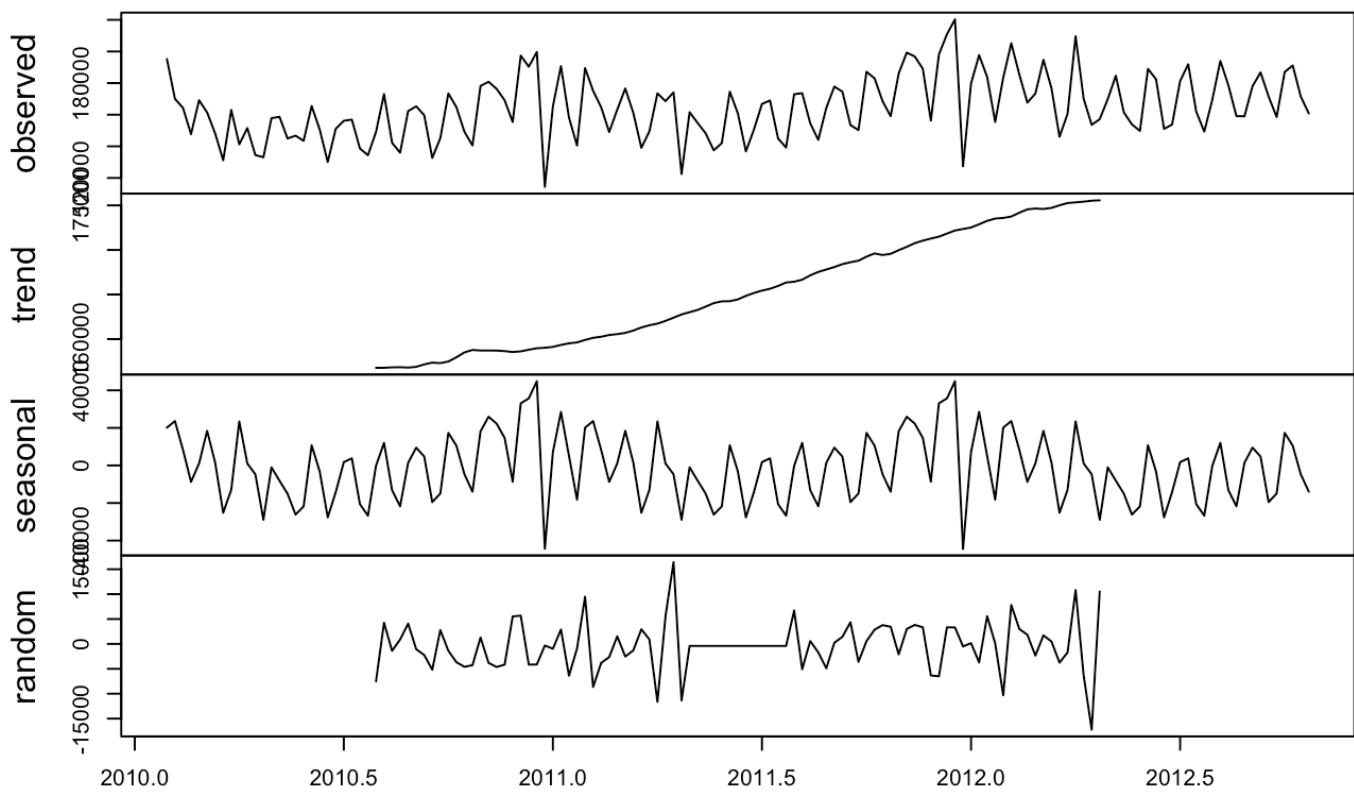
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

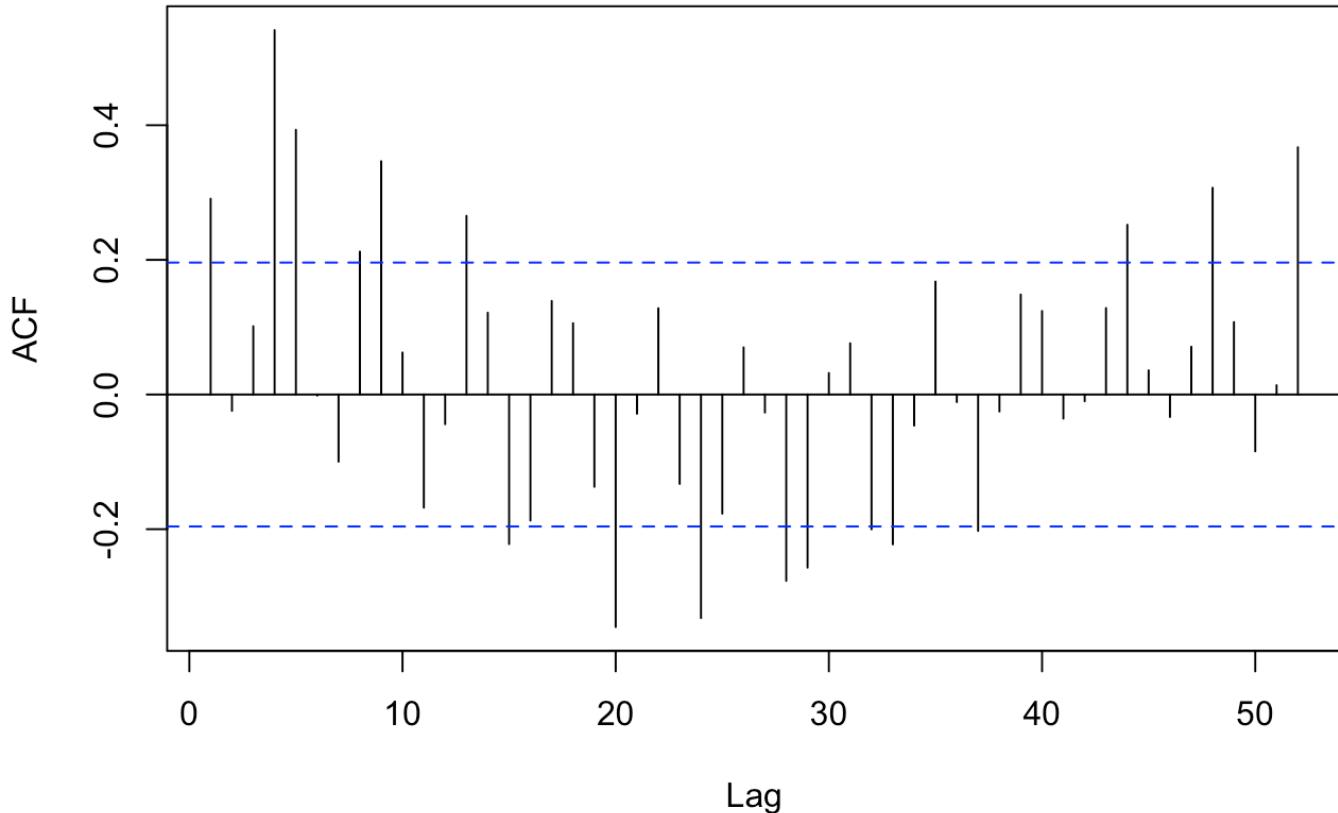
```
## [1] "Showing the results of store = 20 department = 92"
```



Decomposition of additive time series



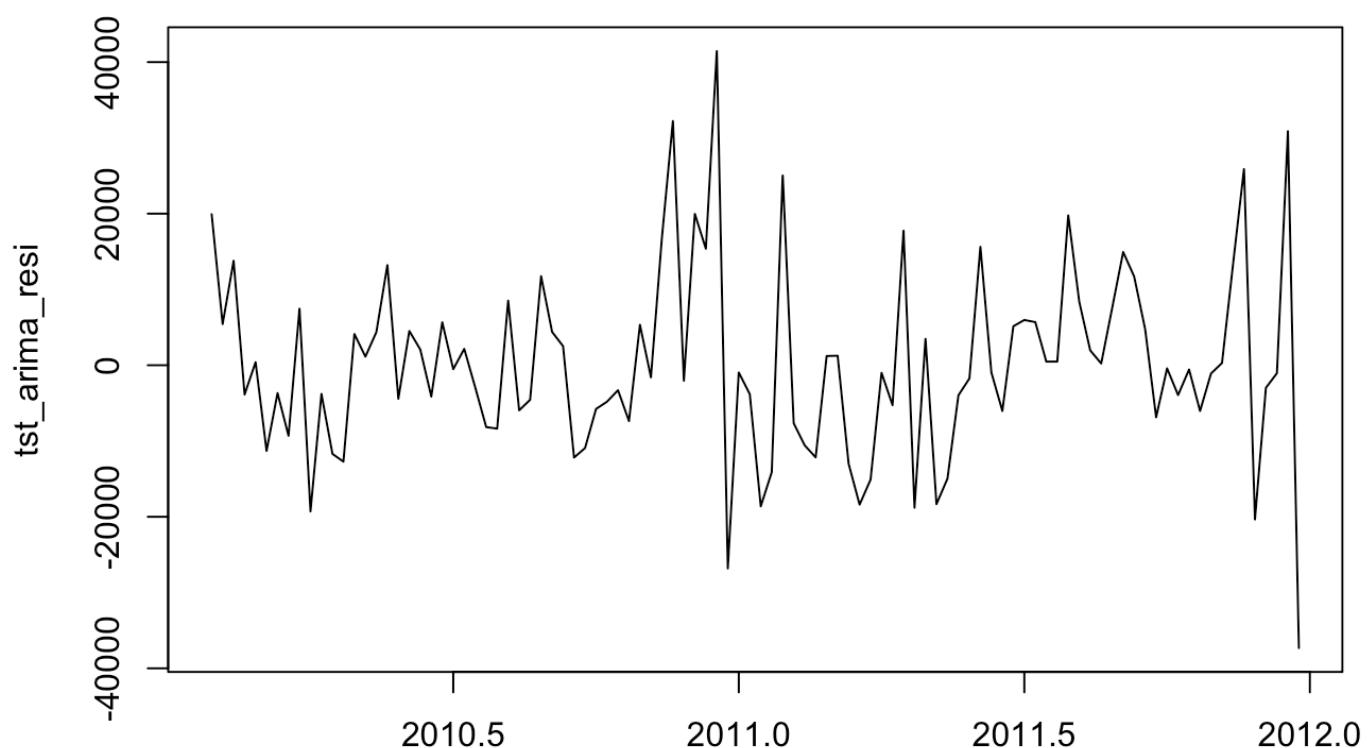
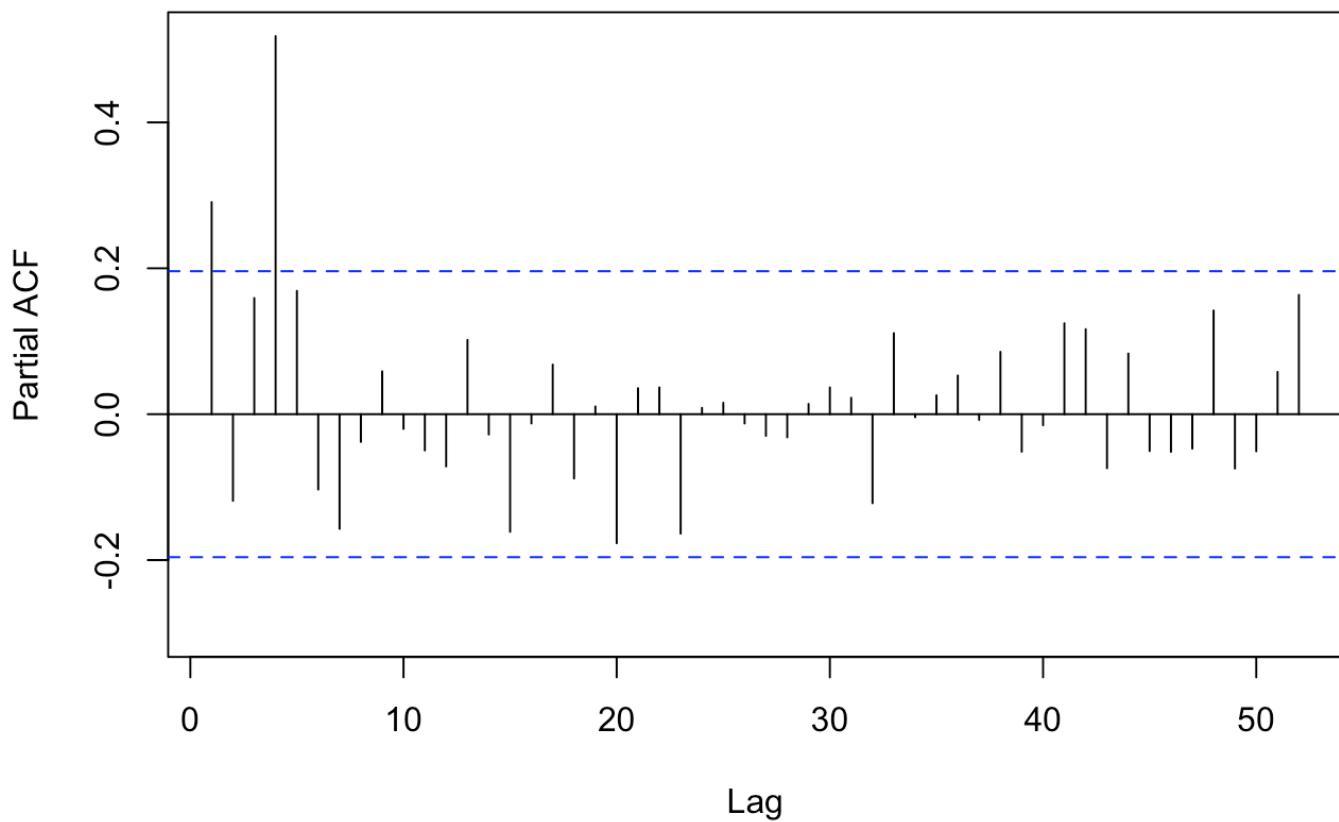
Time

Series train_sales

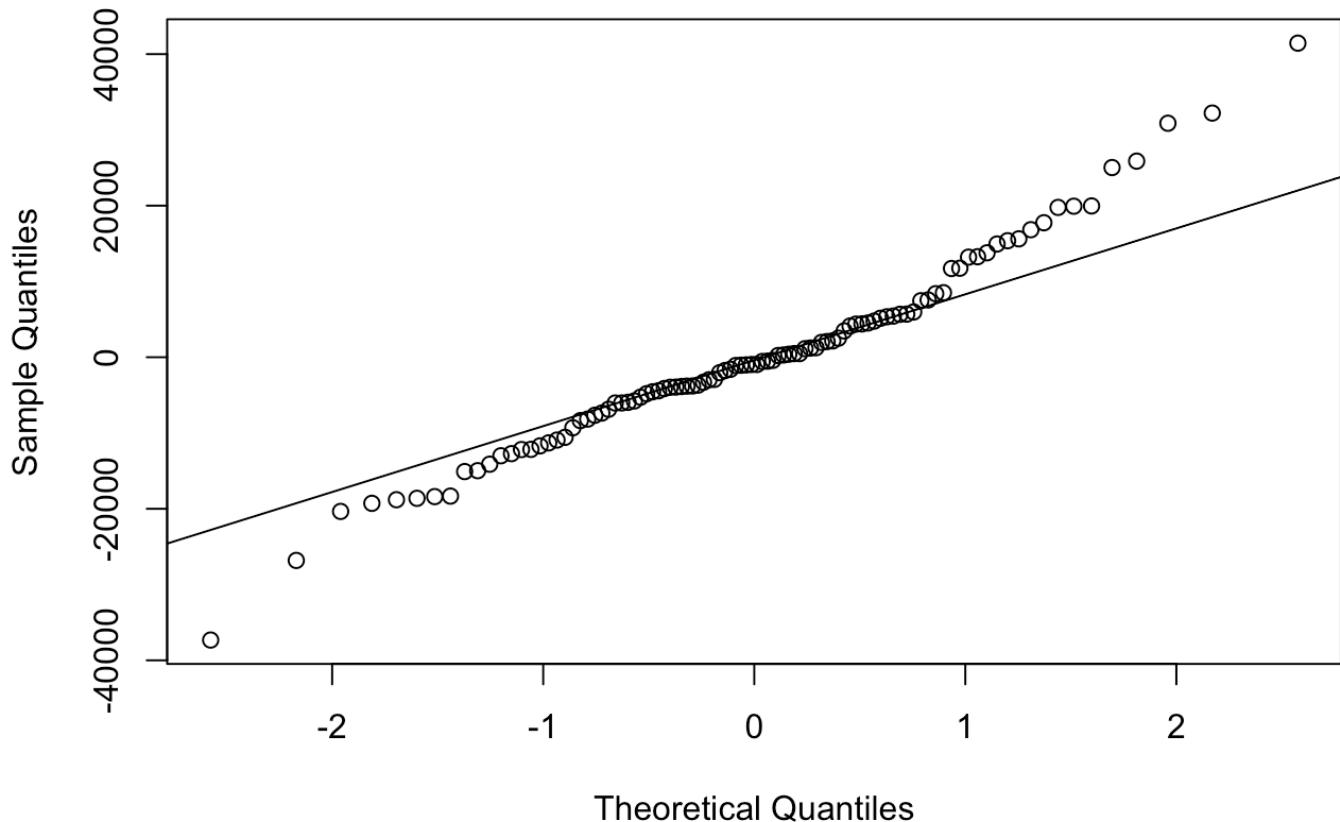
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

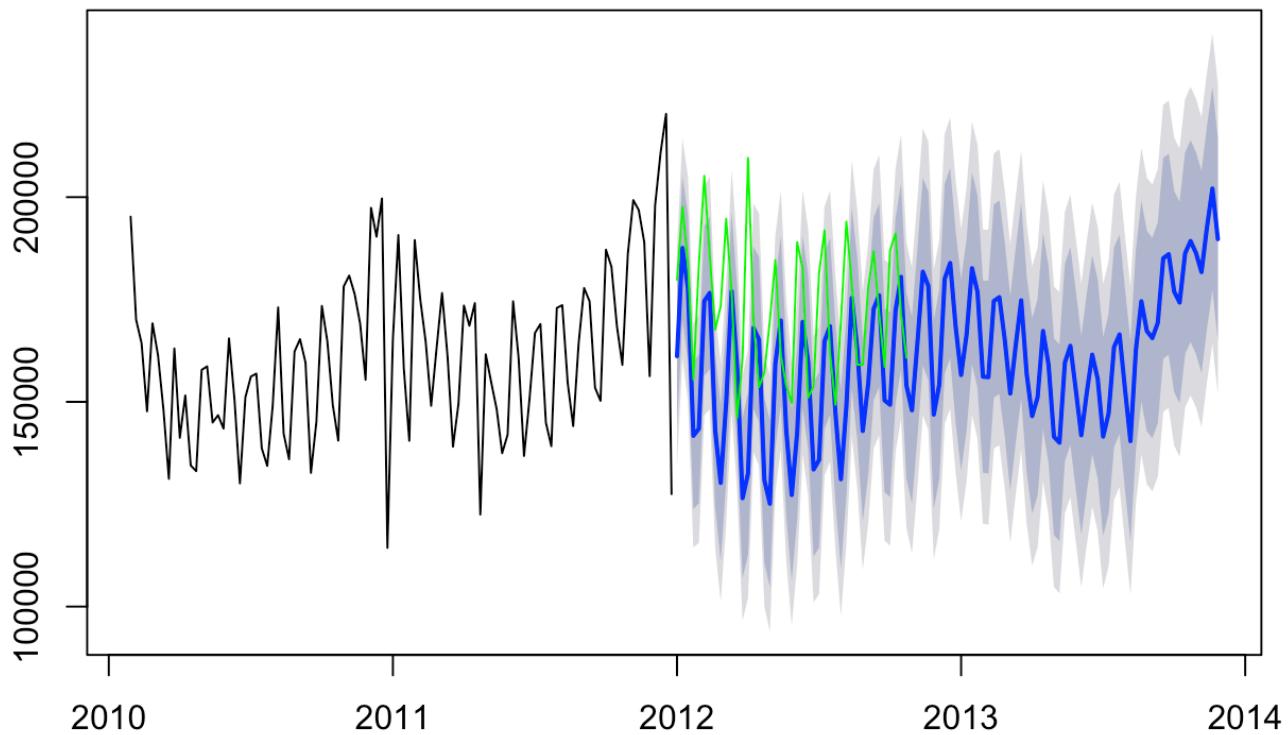

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```

## [1] "21 out of 25 Completed"
## [1] "84 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 20 20 20 20 20 20 20 20 20 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
## $ Weekly_Sales: num 162622 151611 135949 130170 147850 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int 203742 203742 203742 203742 203742 203742 203742 203742 ...
## $ Temperature: num 25.9 22.1 25.4 32.3 31.8 ...
## $ Fuel_Price : num 2.78 2.77 2.75 2.75 2.78 ...
## $ MarkDown1  : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2  : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3  : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4  : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5  : num NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num 204 204 204 204 204 ...
## $ Unemployment: num 8.19 8.19 8.19 8.19 8.19 ...
##
## iter imp variable

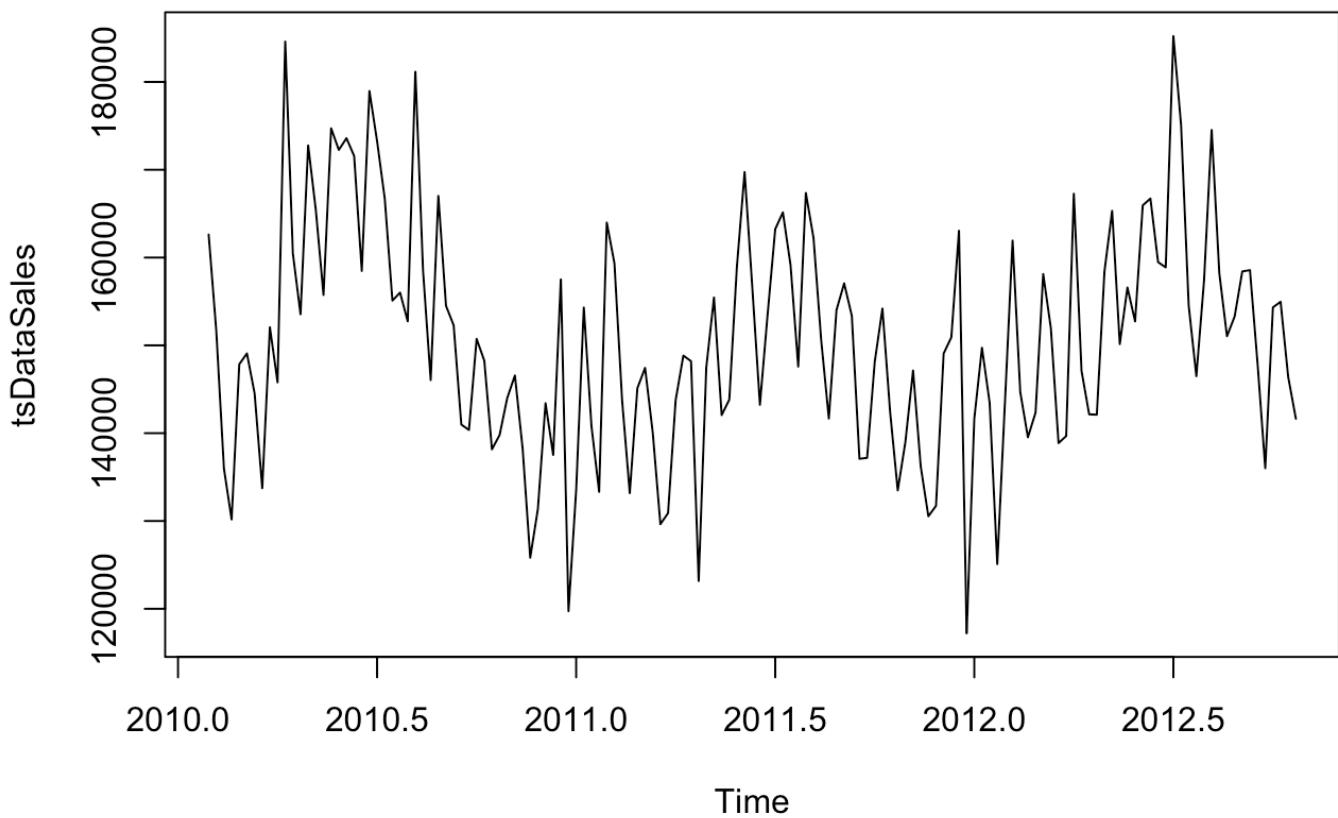
```

```

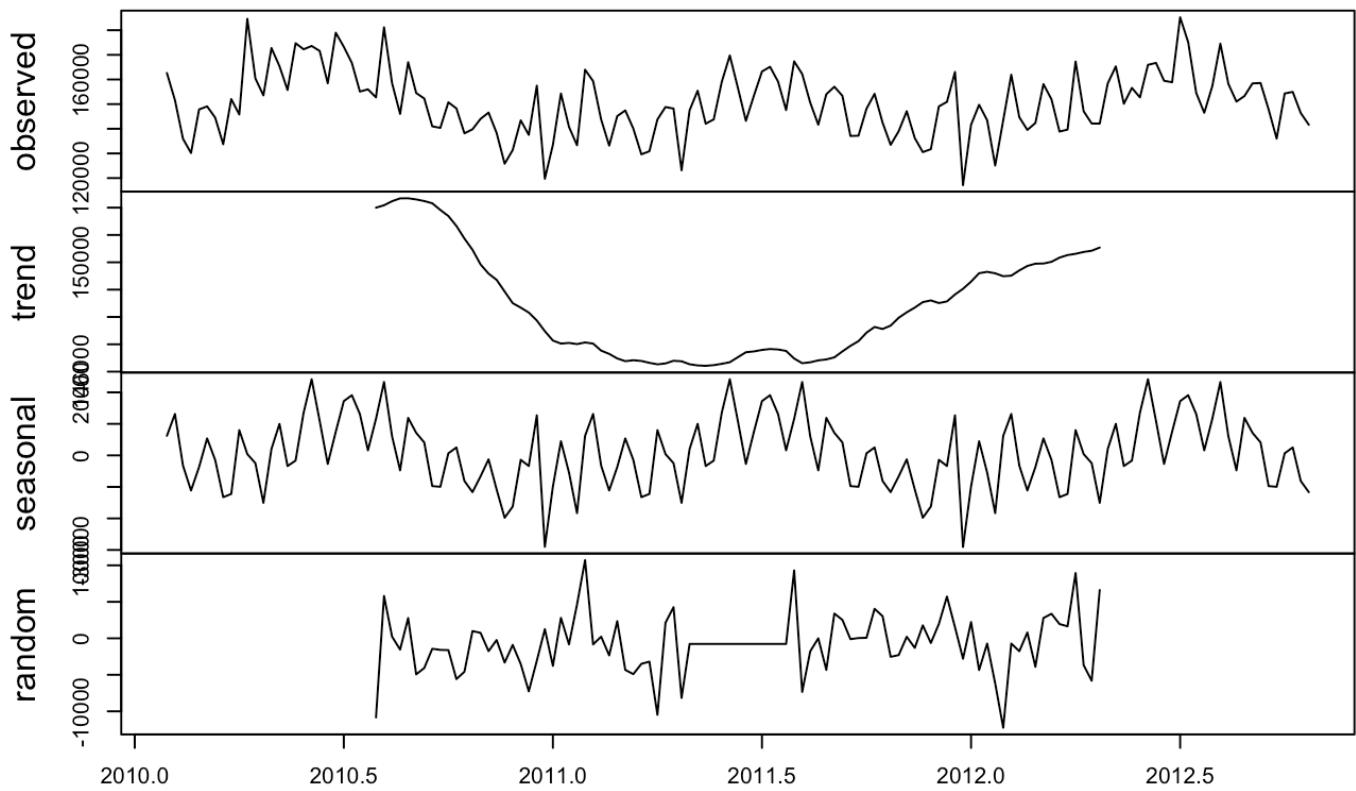
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5

```

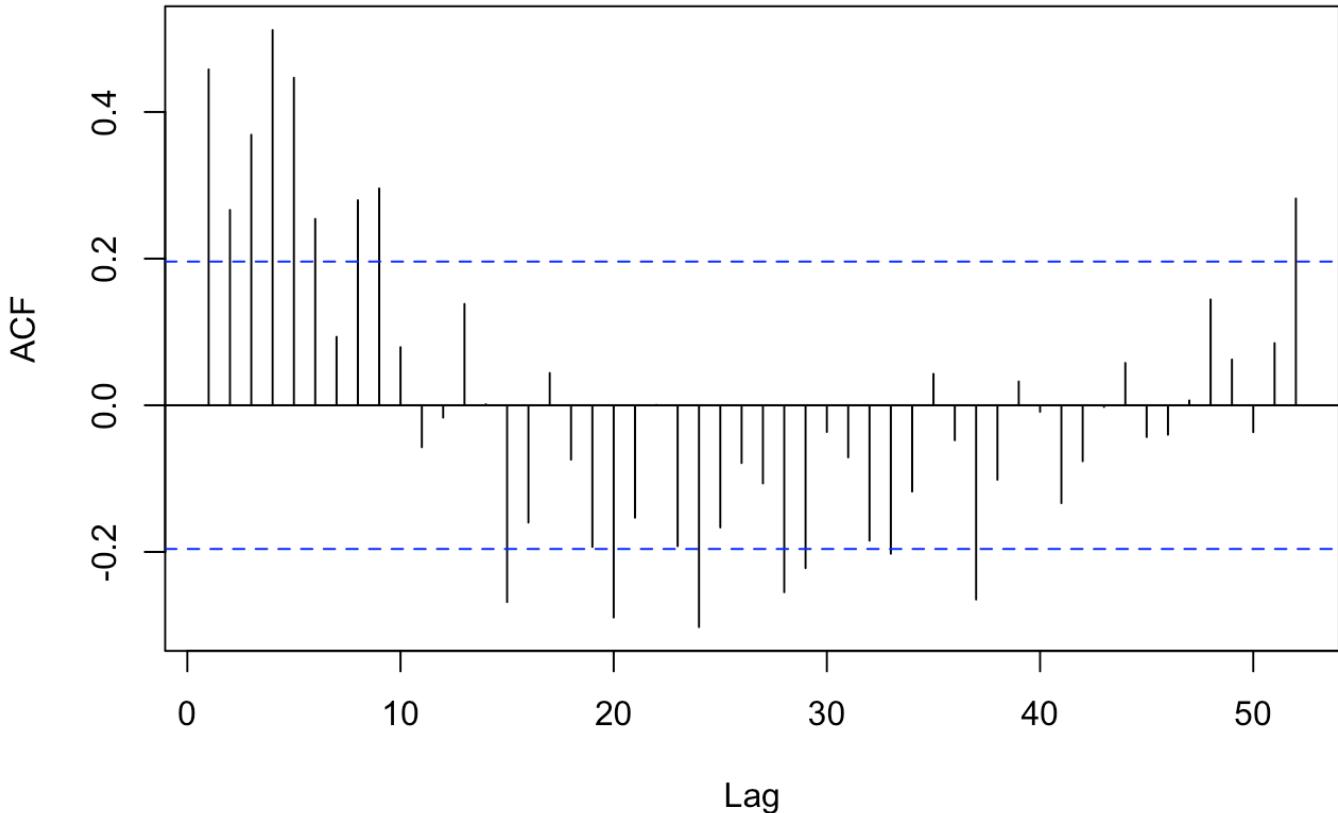
```
## [1] "Showing the results of store = 20 department = 95"
```



Decomposition of additive time series



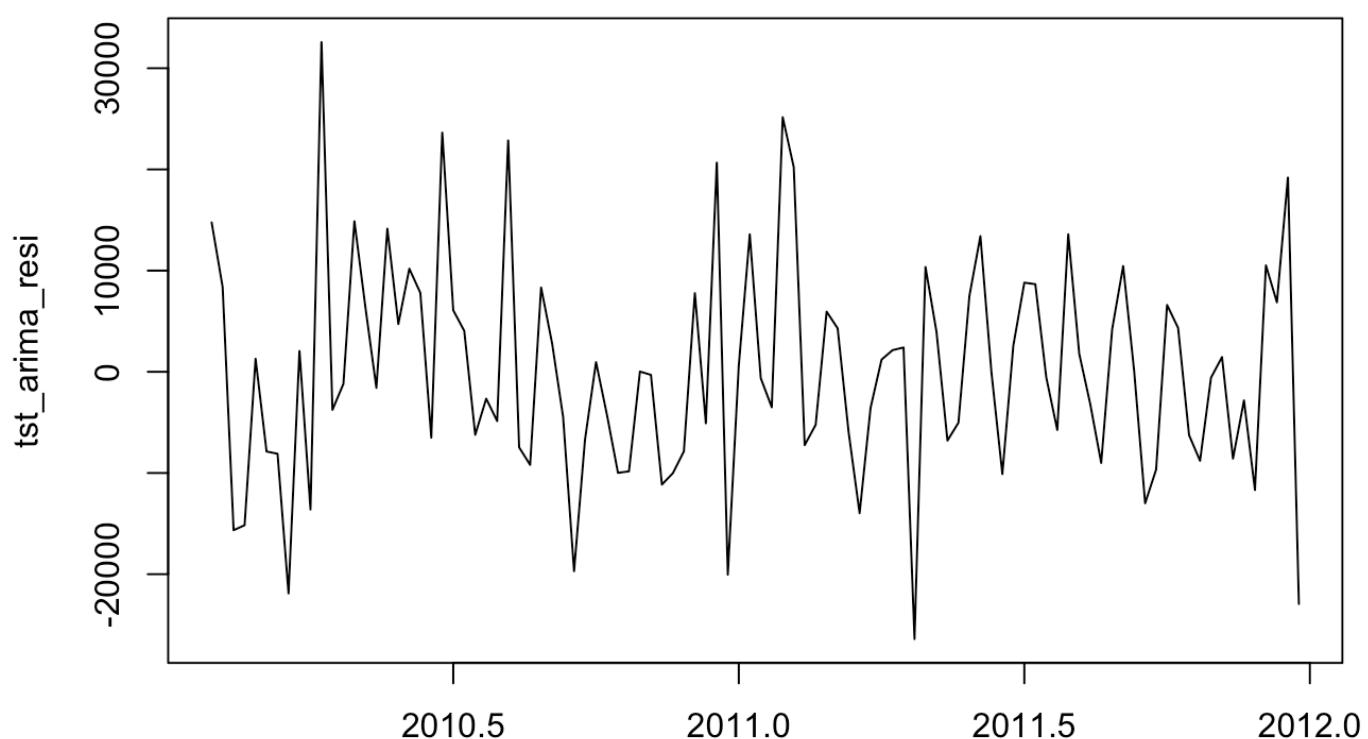
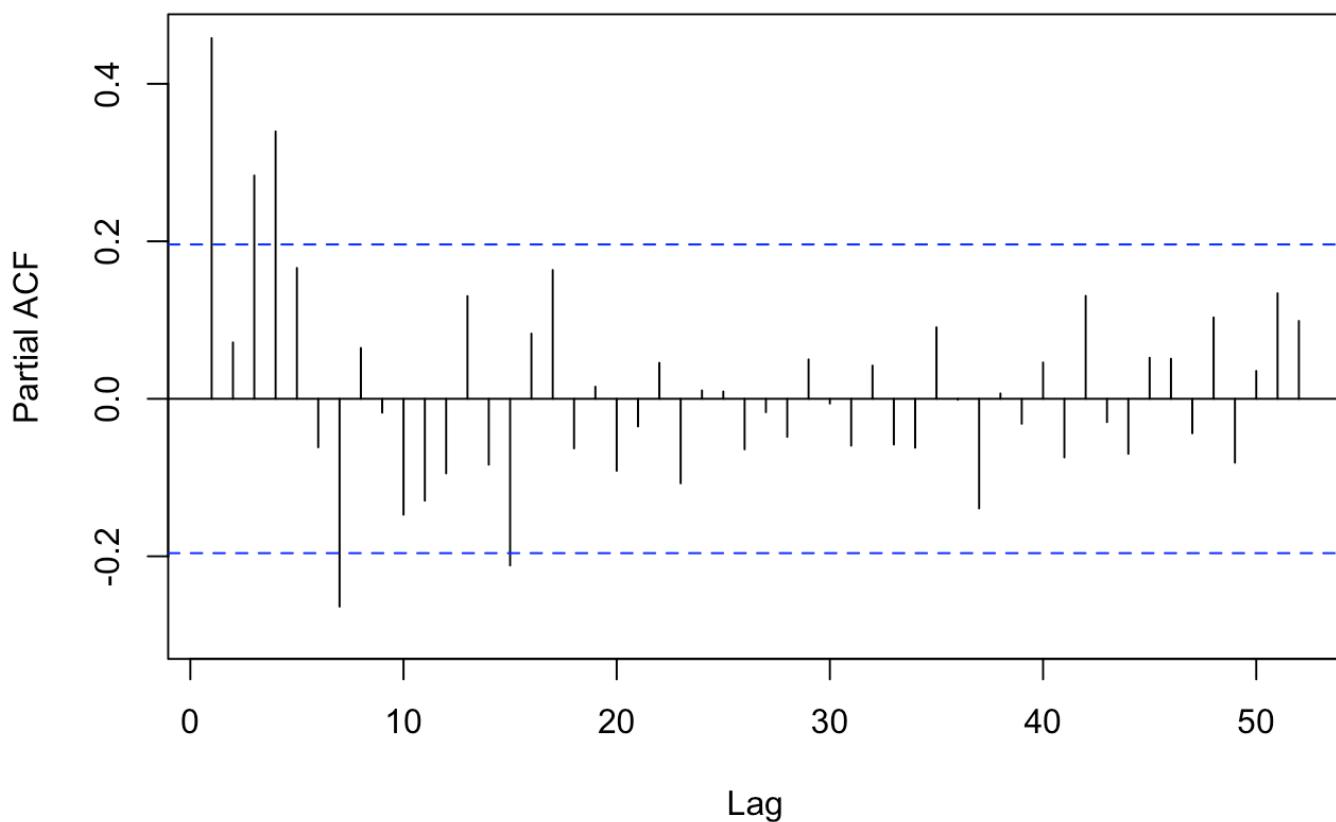
Time

Series train_sales

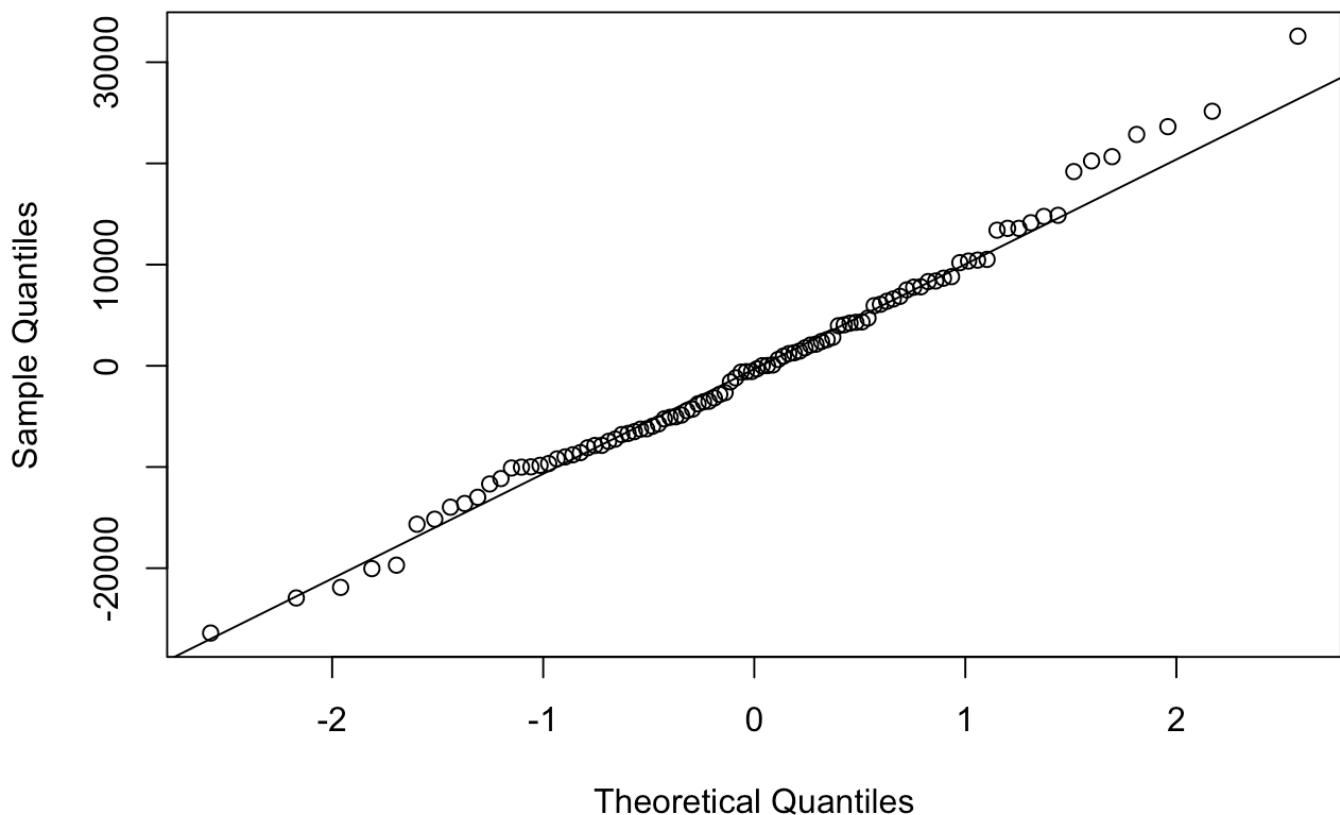
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

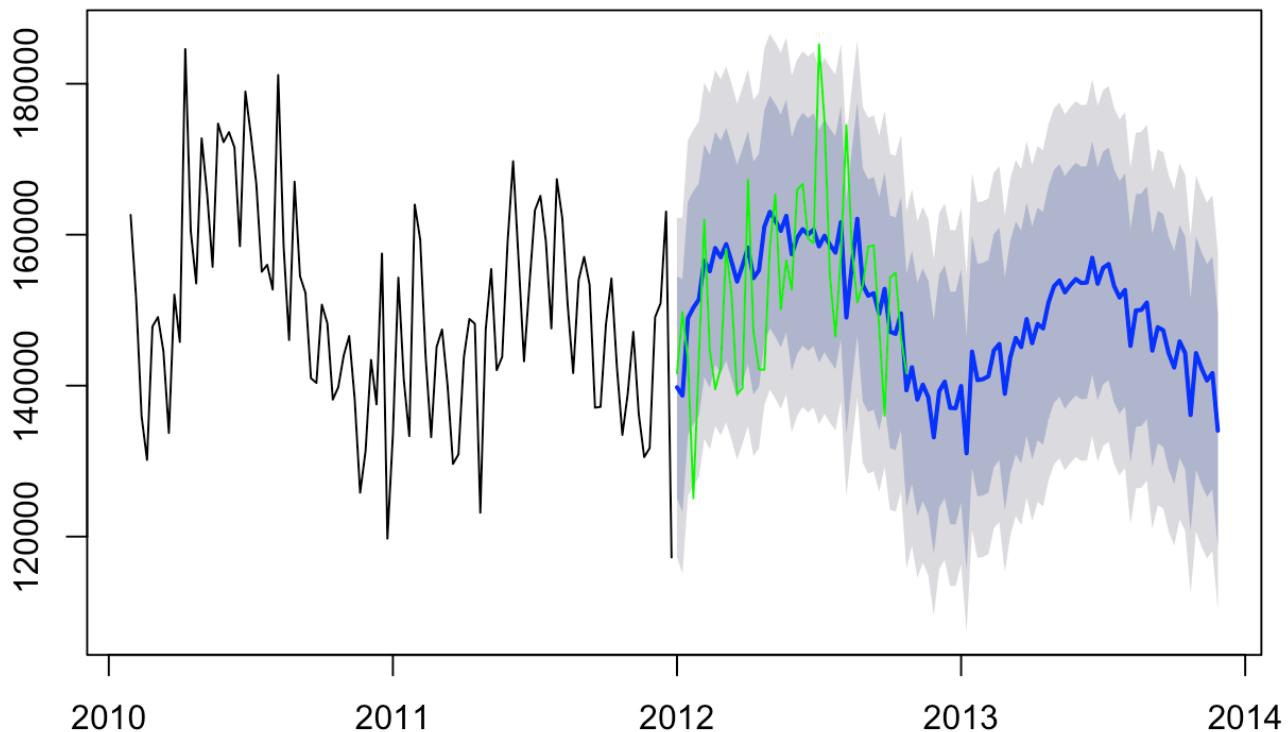

Original Time Series



Time

Normal Q-Q Plot

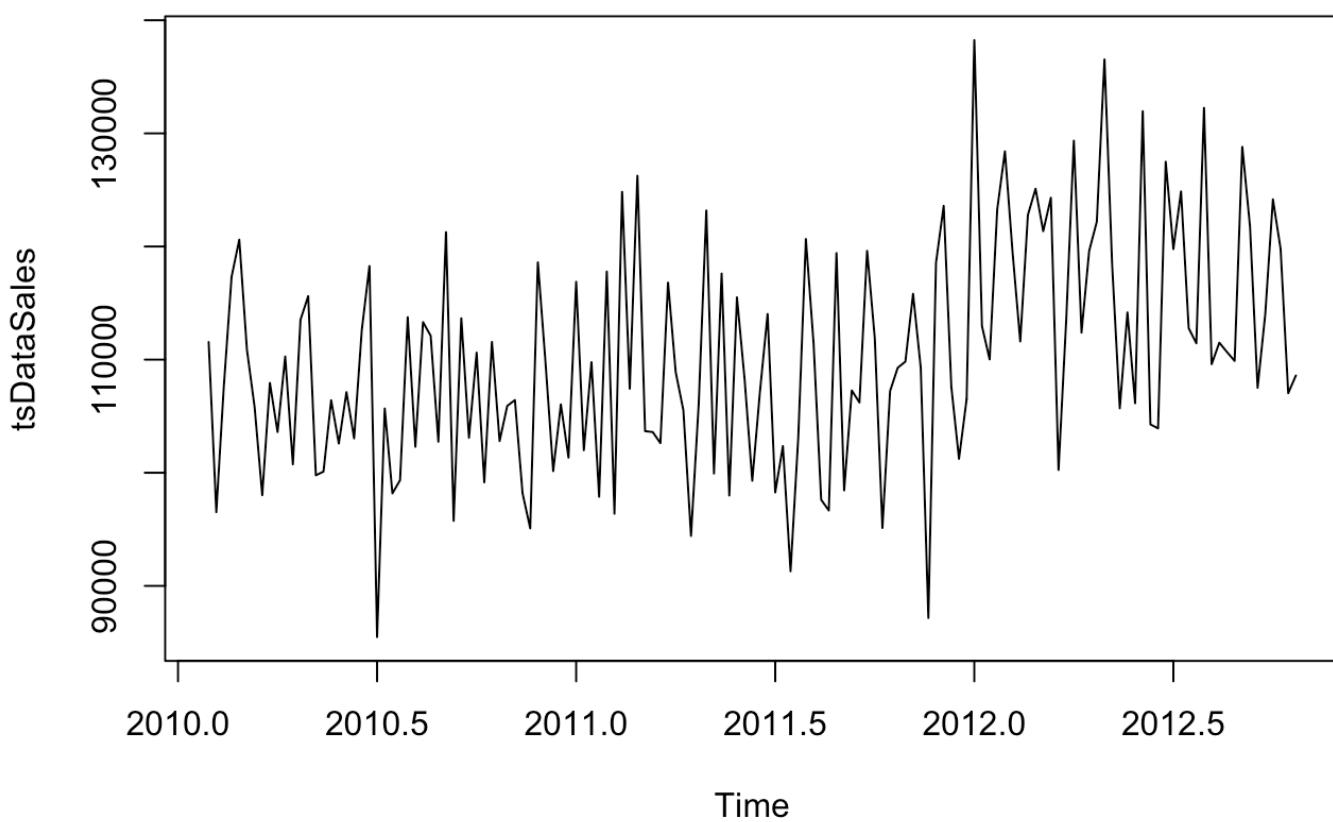
Prediction from Auto Arima for Weekly Sales



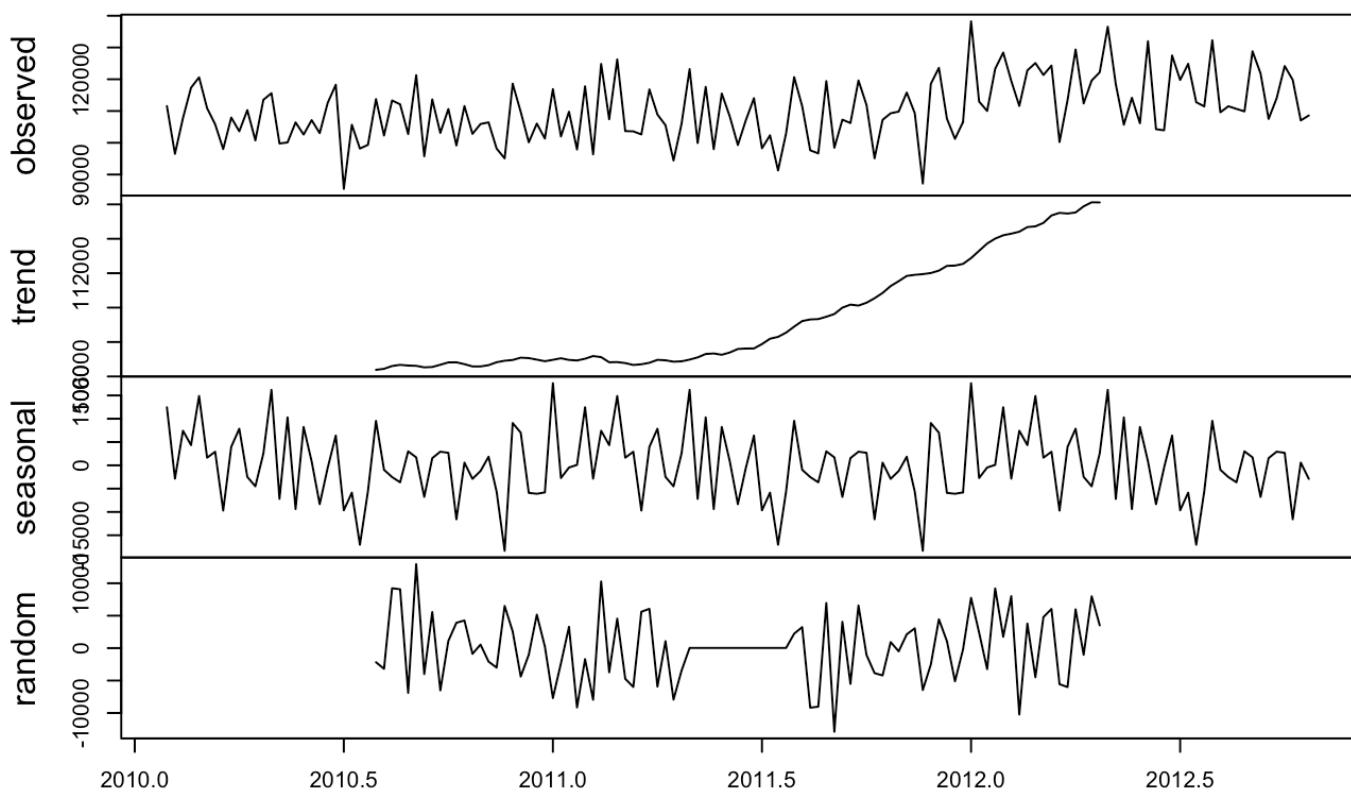
```
## [1] "22 out of 25 Completed"
## [1] "88 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 20 20 20 20 20 20 20 20 20 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...: 1 2 3 4 5 6
## $ IsHoliday   : logi FALSE TRUE FALSE FALSE FALSE ...
## $ Dept        : int 38 38 38 38 38 38 38 38 38 ...
## $ Weekly_Sales: num 111555 96518 107796 117335 120605 ...
## $ Type        : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size        : int 203742 203742 203742 203742 203742 203742 203742 203742 203742 ...
## $ Temperature : num 25.9 22.1 25.4 32.3 31.8 ...
## $ Fuel_Price   : num 2.78 2.77 2.75 2.75 2.78 ...
## $ Markdown1   : num NA NA NA NA NA NA NA NA NA ...
## $ Markdown2   : num NA NA NA NA NA NA NA NA NA ...
## $ Markdown3   : num NA NA NA NA NA NA NA NA NA ...
## $ Markdown4   : num NA NA NA NA NA NA NA NA NA ...
## $ Markdown5   : num NA NA NA NA NA NA NA NA NA ...
## $ CPI         : num 204 204 204 204 204 ...
## $ Unemployment: num 8.19 8.19 8.19 8.19 8.19 ...
##
## iter imp variable
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

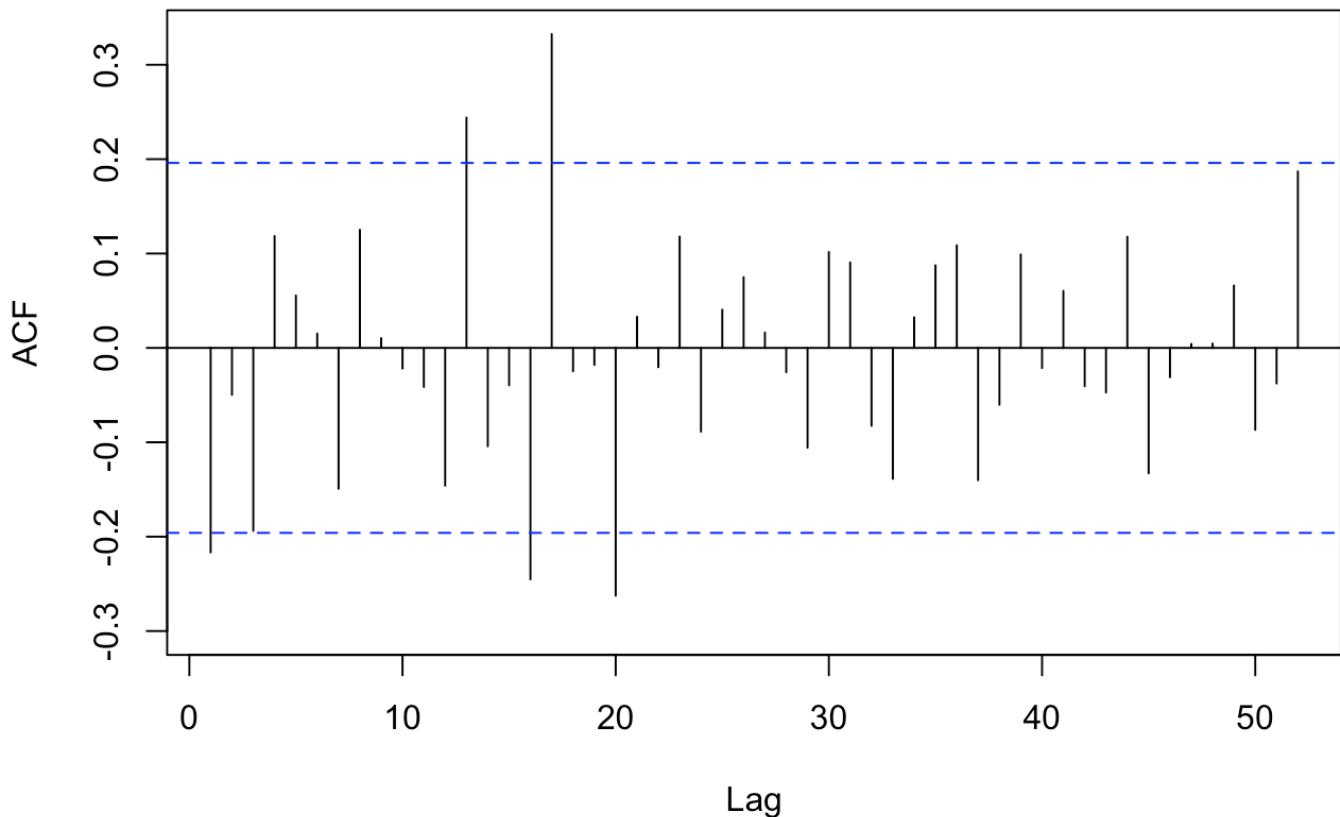
```
## [1] "Showing the results of store = 20 department = 38"
```



Decomposition of additive time series



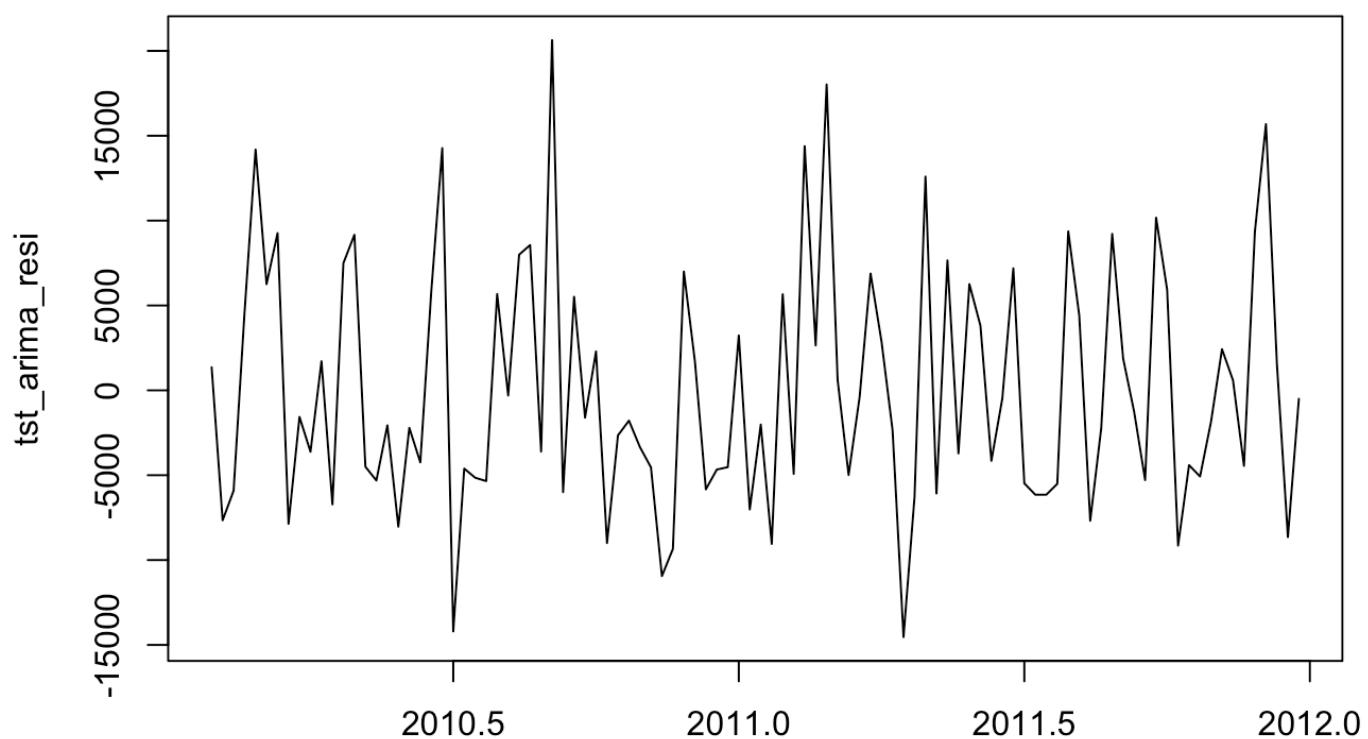
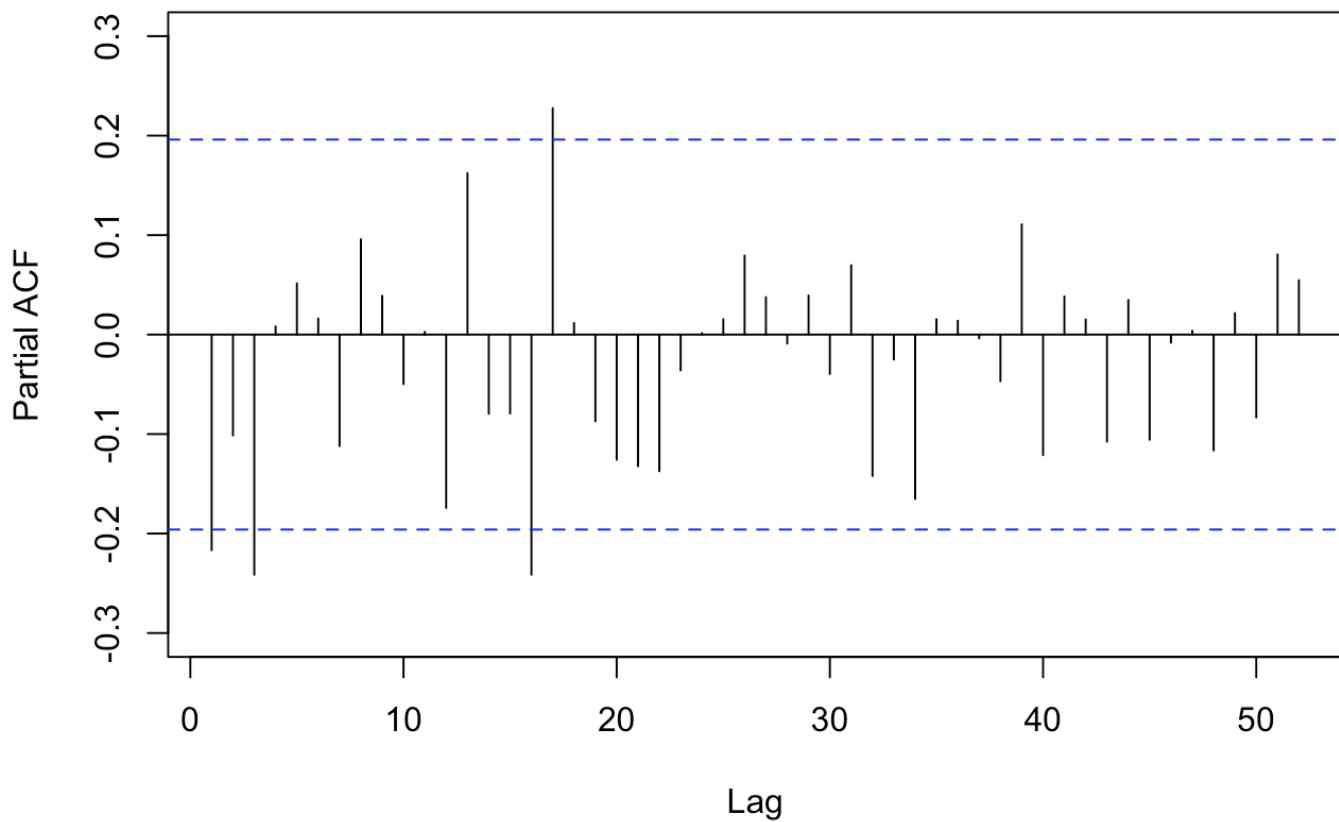
Time

Series train_sales

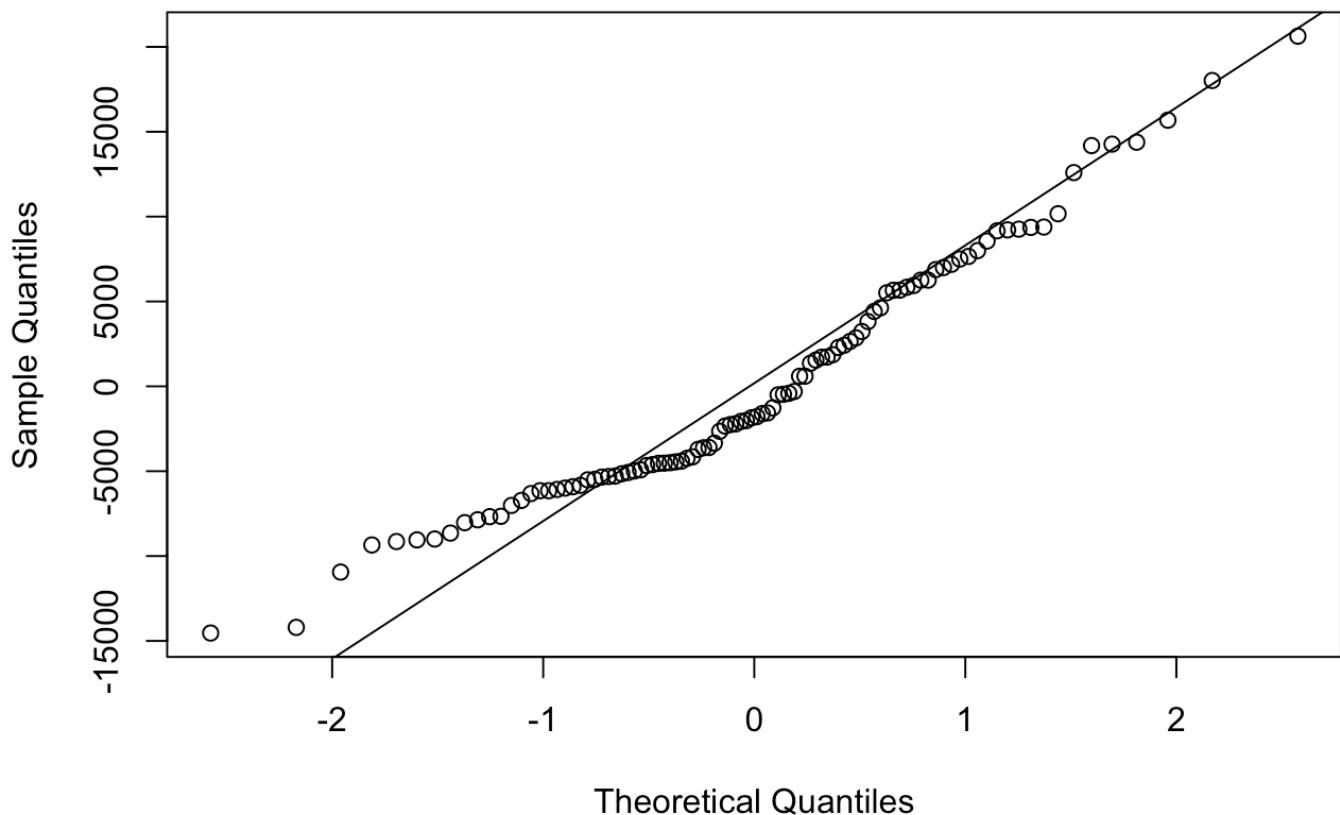
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

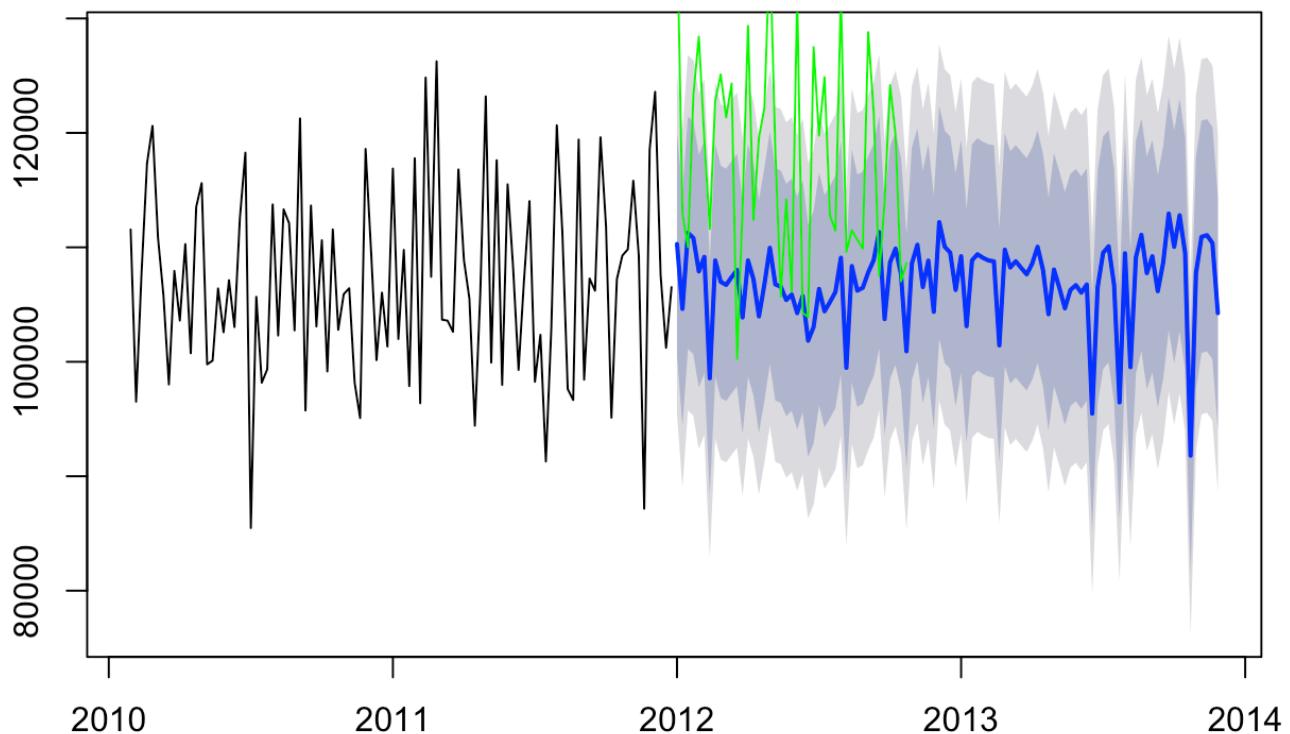

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



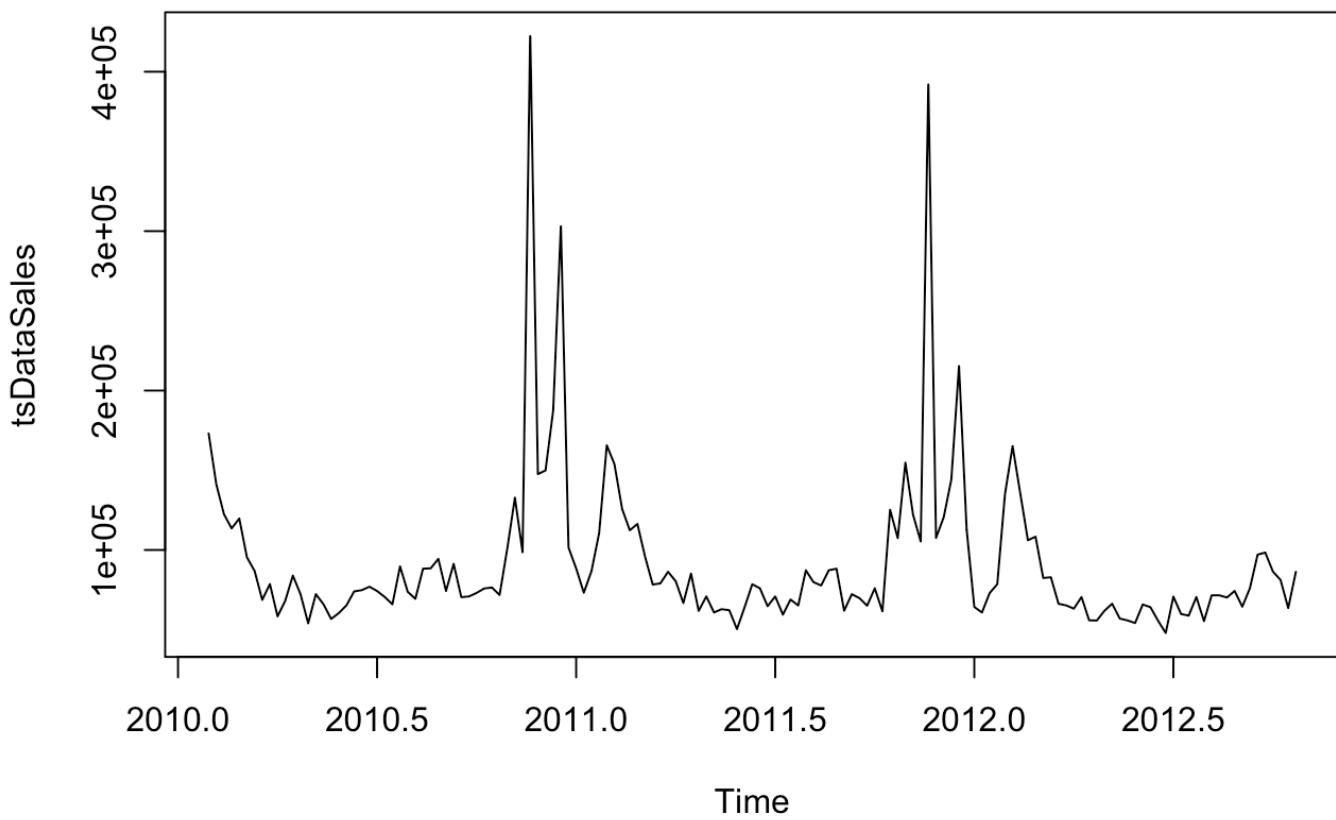
```

## [1] "23 out of 25 Completed"
## [1] "92 % Completed"
## 'data.frame': 143 obs. of 16 variables:
## $ Store      : int 20 20 20 20 20 20 20 20 20 ...
## $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
## $ Weekly_Sales: num 173076 141188 122434 113539 119719 ...
## $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
## $ Size       : int 203742 203742 203742 203742 203742 203742 203742 203742 ...
## $ Temperature: num 25.9 22.1 25.4 32.3 31.8 ...
## $ Fuel_Price  : num 2.78 2.77 2.75 2.75 2.78 ...
## $ MarkDown1   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown2   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown3   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown4   : num NA NA NA NA NA NA NA NA NA ...
## $ MarkDown5   : num NA NA NA NA NA NA NA NA NA ...
## $ CPI        : num 204 204 204 204 204 ...
## $ Unemployment: num 8.19 8.19 8.19 8.19 8.19 ...
##
## iter imp variable

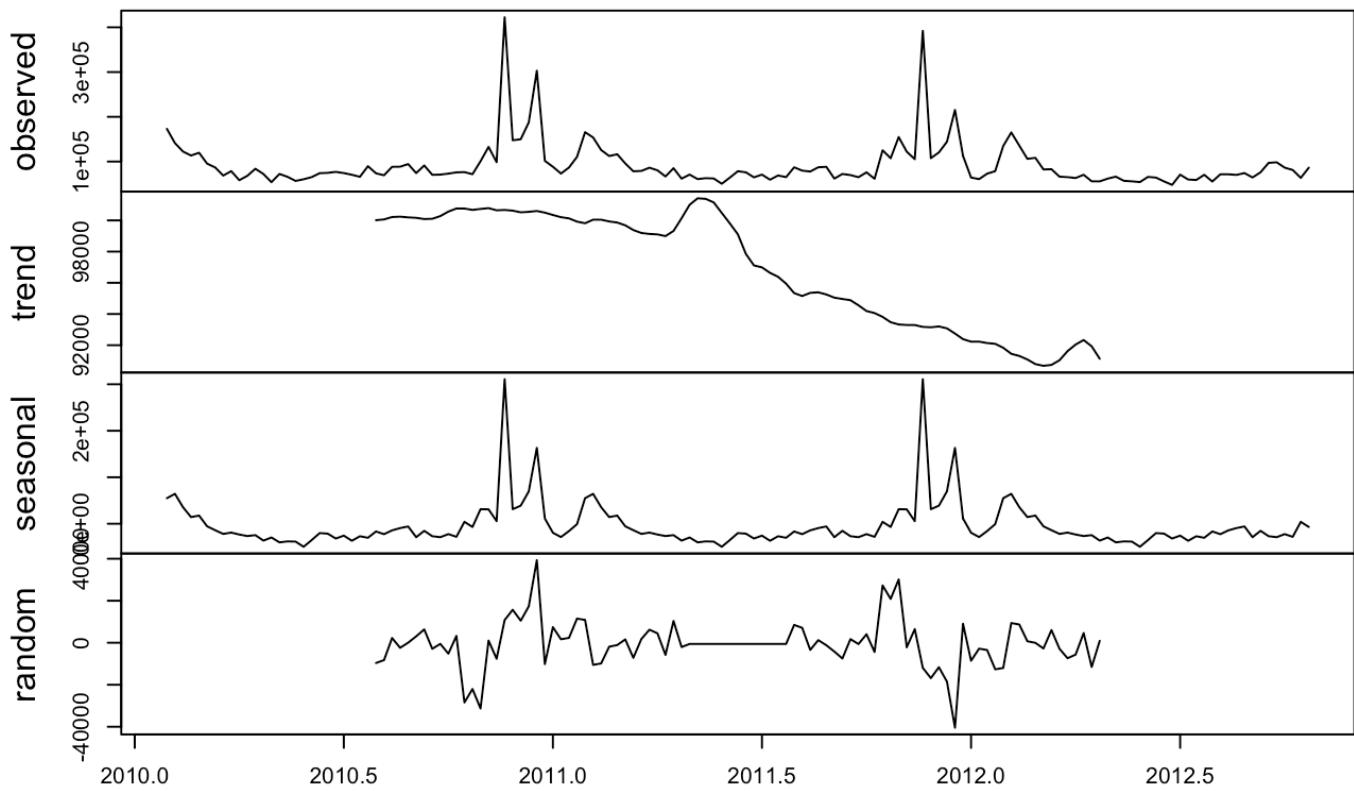
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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## 9 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 10 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
```

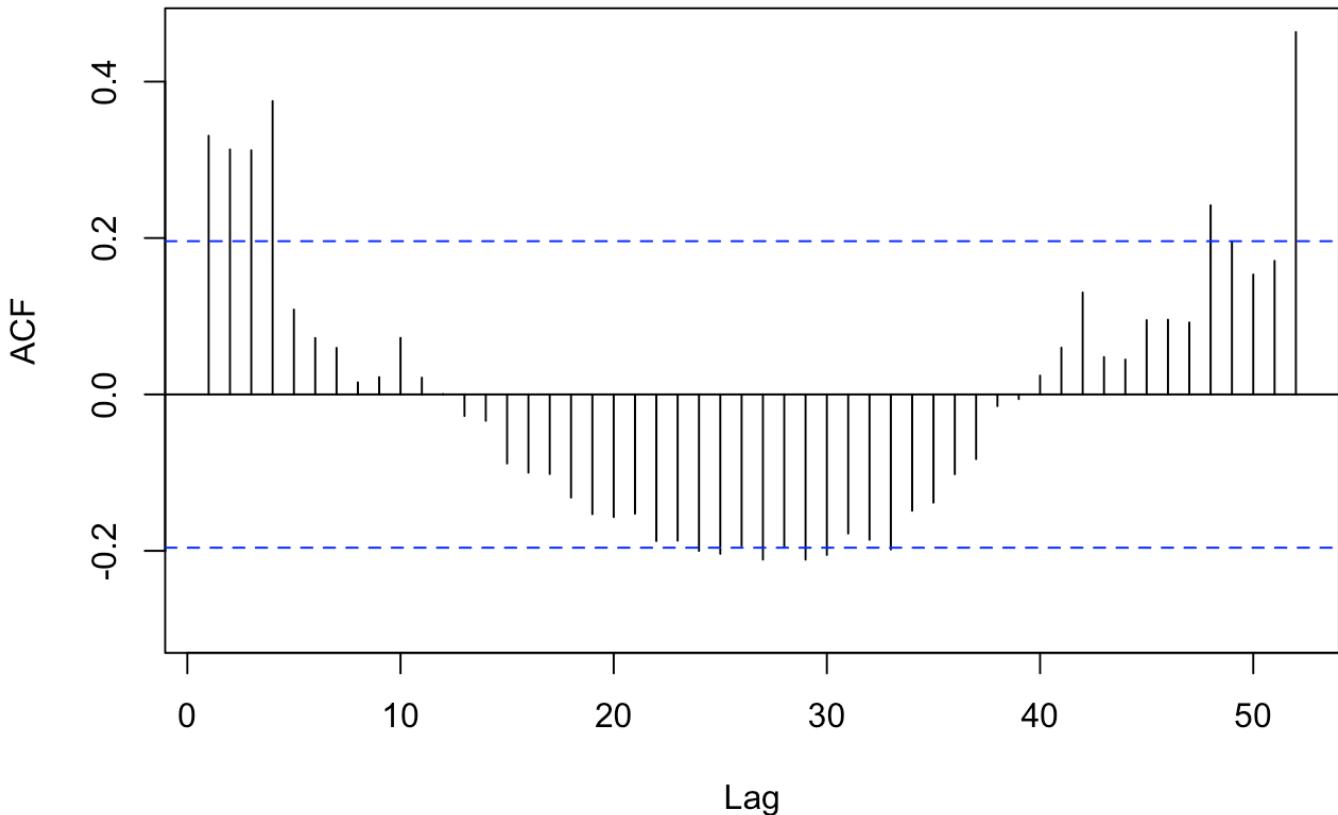
```
## [1] "Showing the results of store = 20 department = 72"
```



Decomposition of additive time series



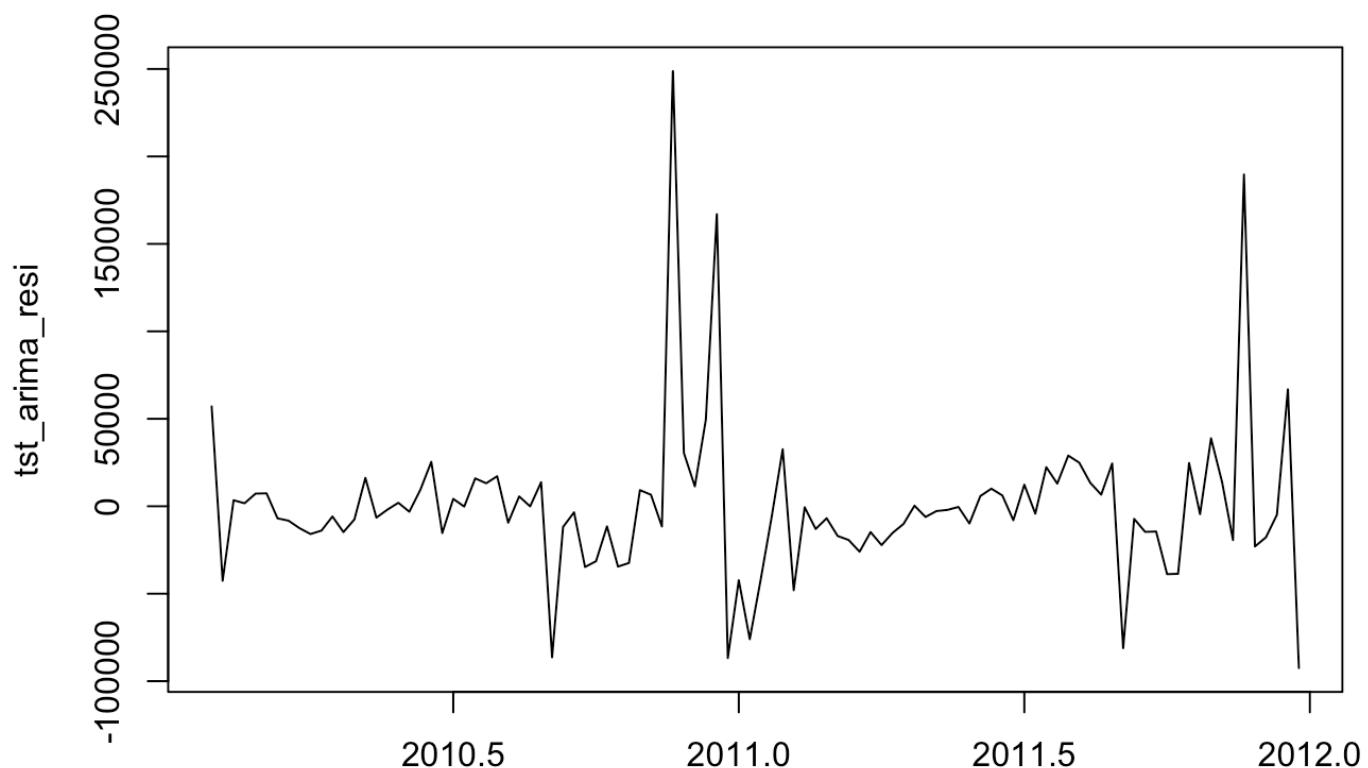
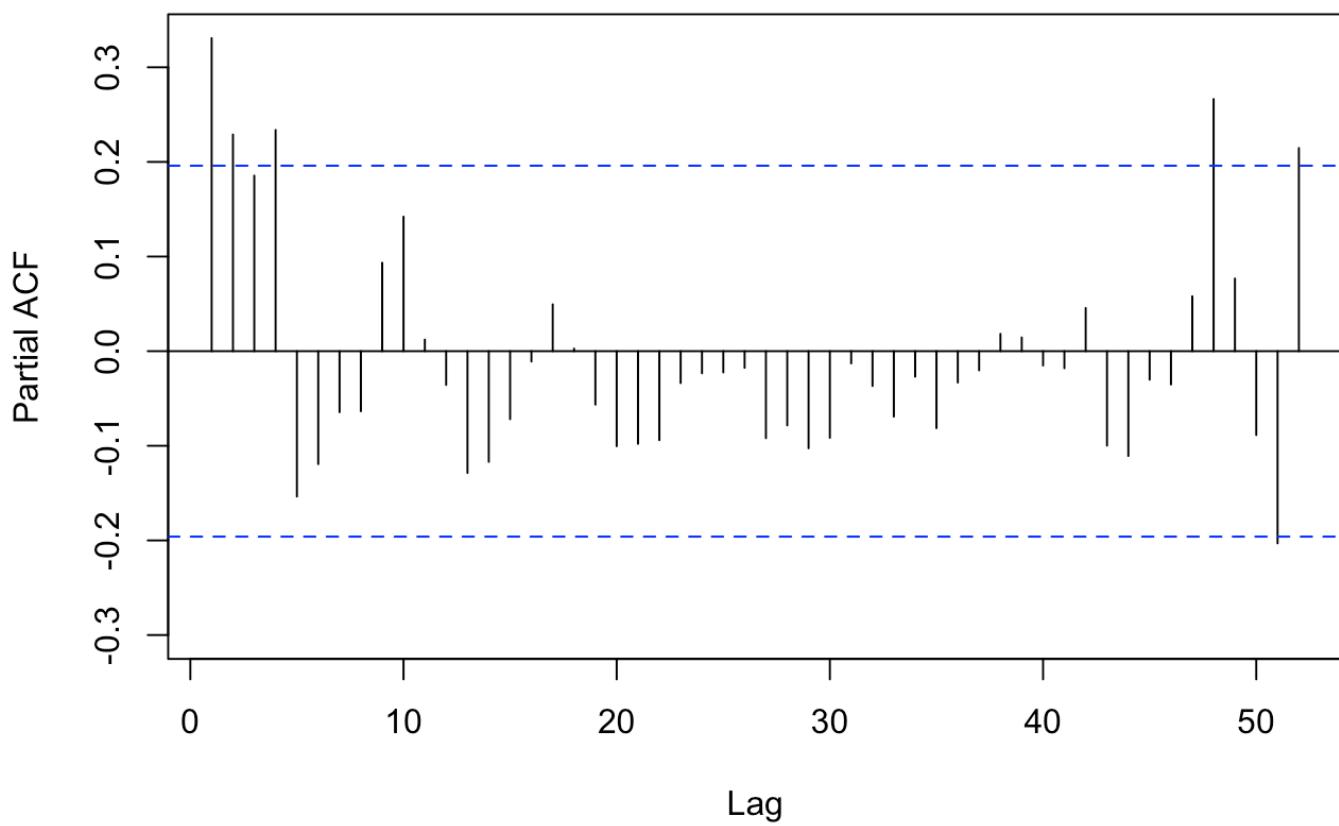
Time

Series train_sales

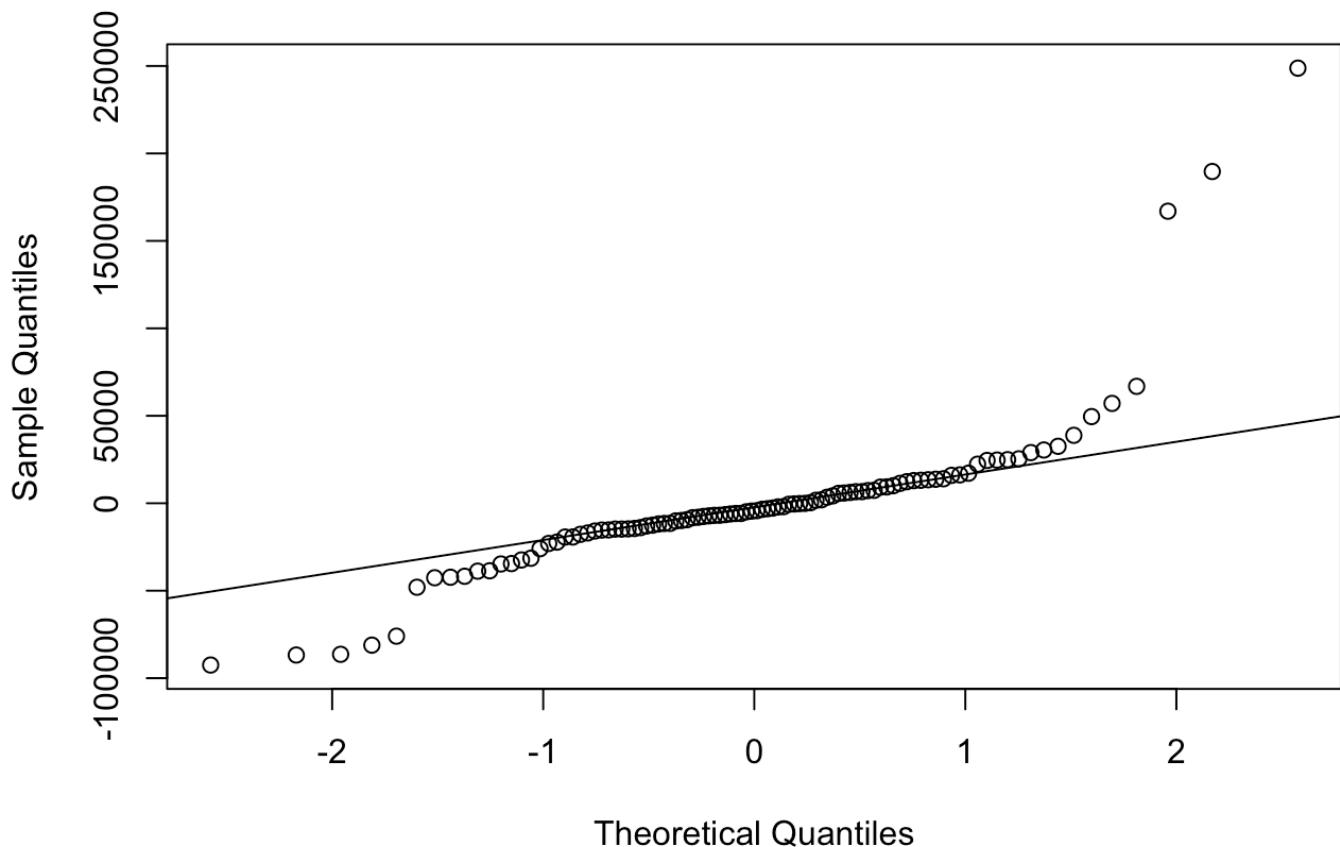
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
```

```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

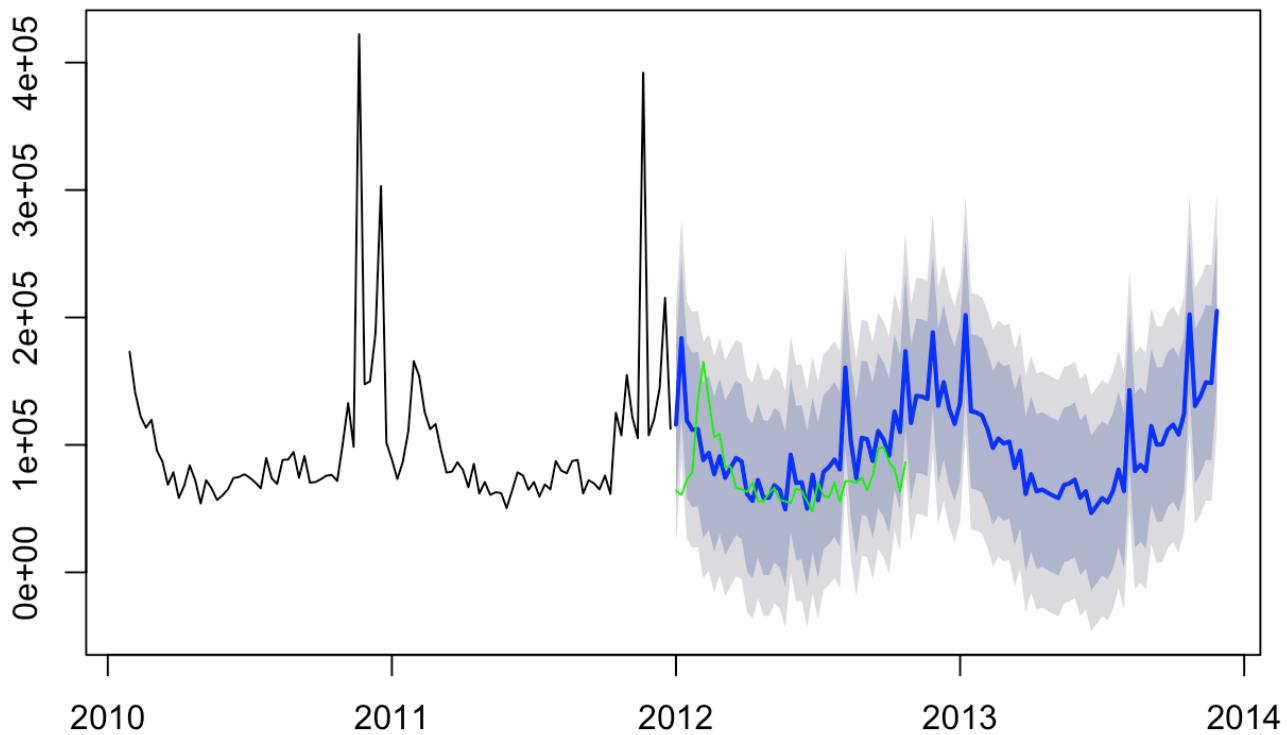

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



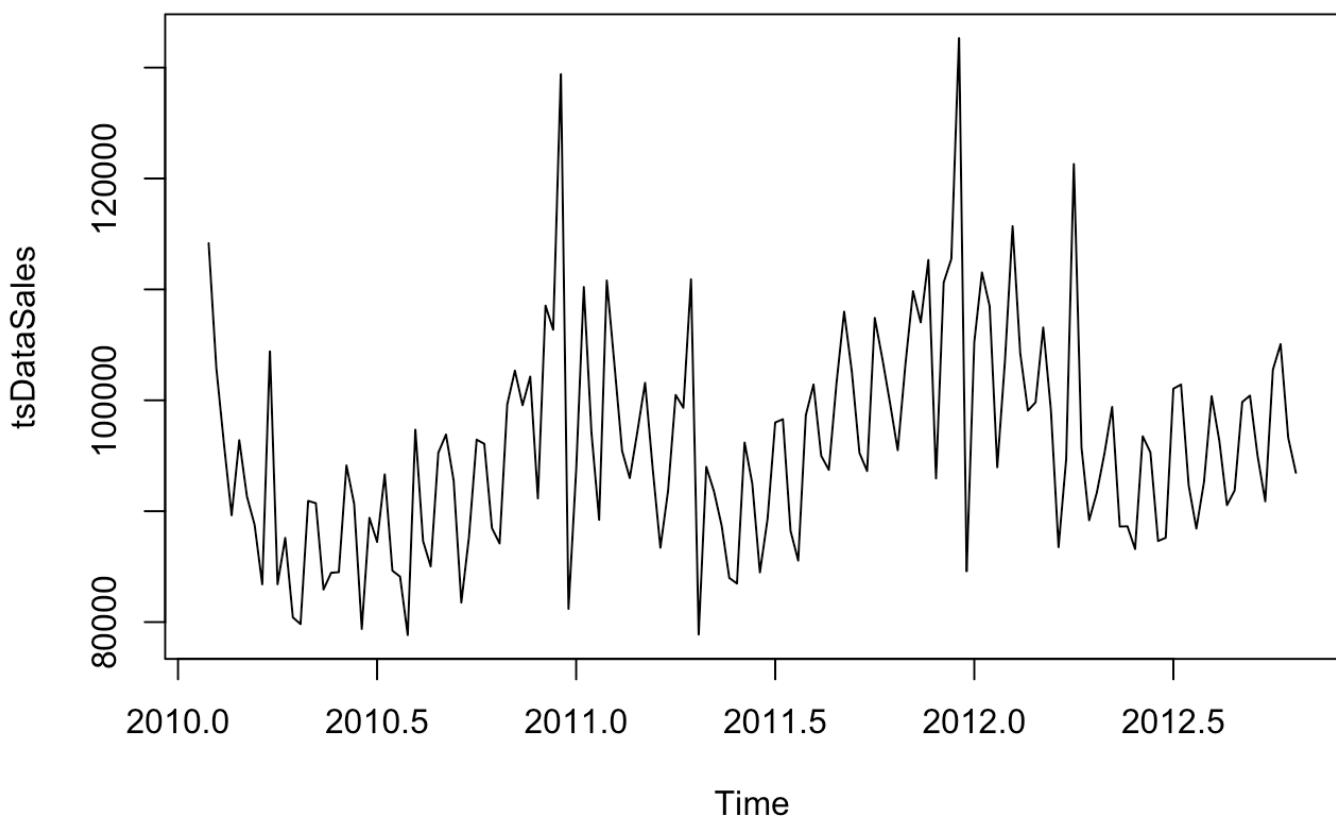
```

## [1] "24  out of  25  Completed"
## [1] "96 % Completed"
## 'data.frame':    143 obs. of  16 variables:
##   $ Store      : int  20 20 20 20 20 20 20 20 20 ...
##   $ Date       : Factor w/ 143 levels "2010-02-05","2010-02-12",...
##   $ Weekly_Sales: num  114164 102924 96080 89635 96401 ...
##   $ Type       : Factor w/ 3 levels "A","B","C": 1 1 1 1 1 1 1 1 1 ...
##   $ Size       : int  203742 203742 203742 203742 203742 203742 203742 203742 ...
##   $ Temperature: num  25.9 22.1 25.4 32.3 31.8 ...
##   $ Fuel_Price : num  2.78 2.77 2.75 2.75 2.78 ...
##   $ MarkDown1  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown2  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown3  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown4  : num  NA NA NA NA NA NA NA NA NA ...
##   $ MarkDown5  : num  NA NA NA NA NA NA NA NA NA ...
##   $ CPI        : num  204 204 204 204 204 ...
##   $ Unemployment: num  8.19 8.19 8.19 8.19 8.19 ...
##
## 
## iter imp variable

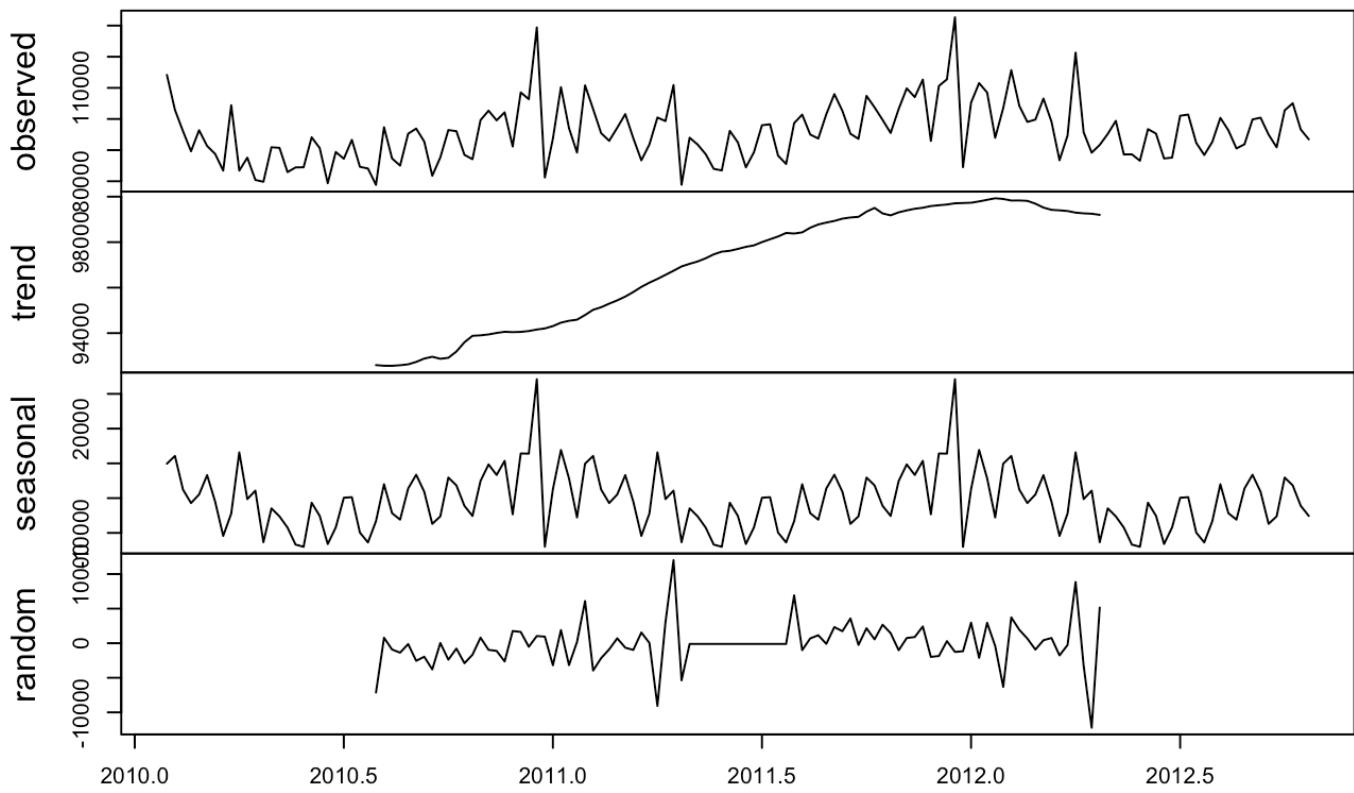
```

```
## 1 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 1 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 2 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 3 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 4 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 5 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 6 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 3 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 4 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 7 5 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 1 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
## 8 2 Markdown1 Markdown2 Markdown3 Markdown4 Markdown5
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```

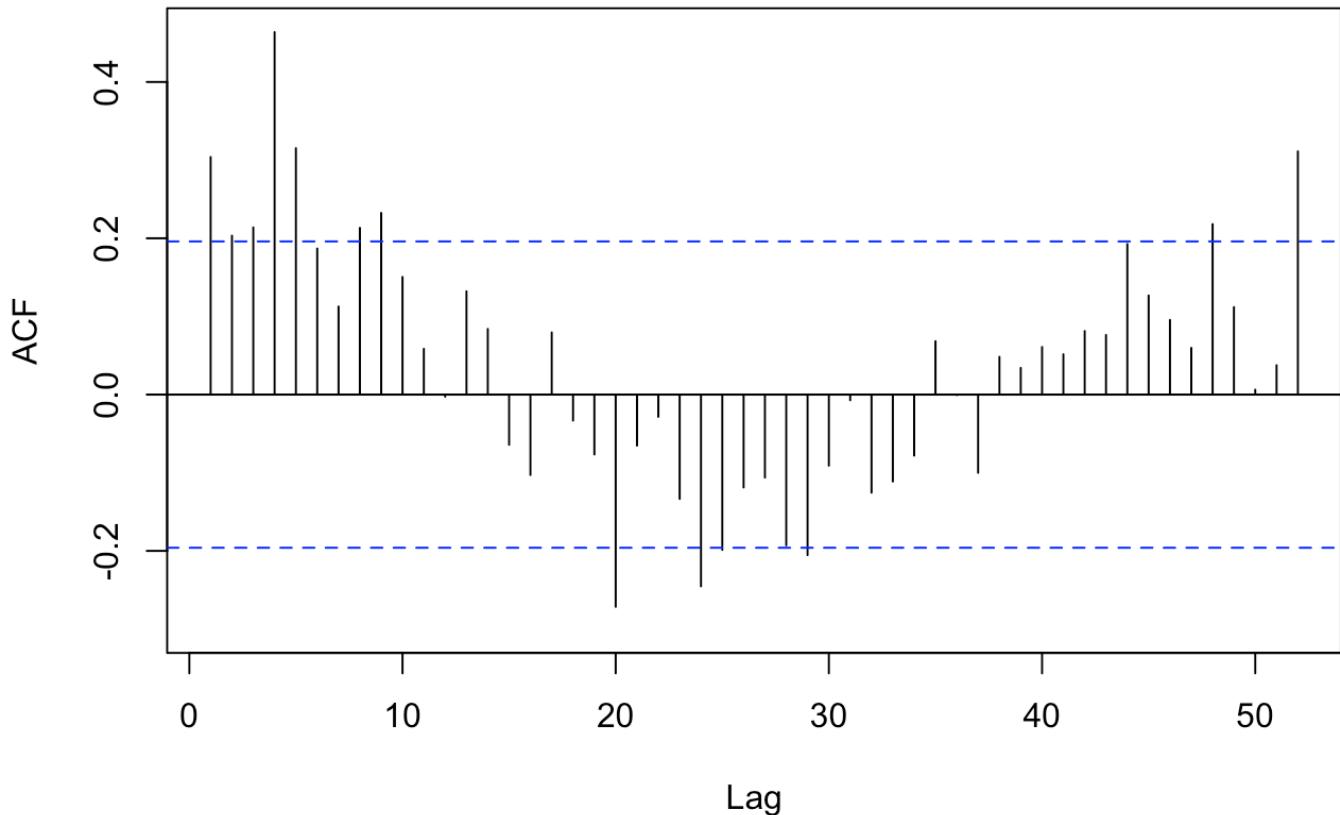
```
## [1] "Showing the results of store = 20 department = 90"
```



Decomposition of additive time series



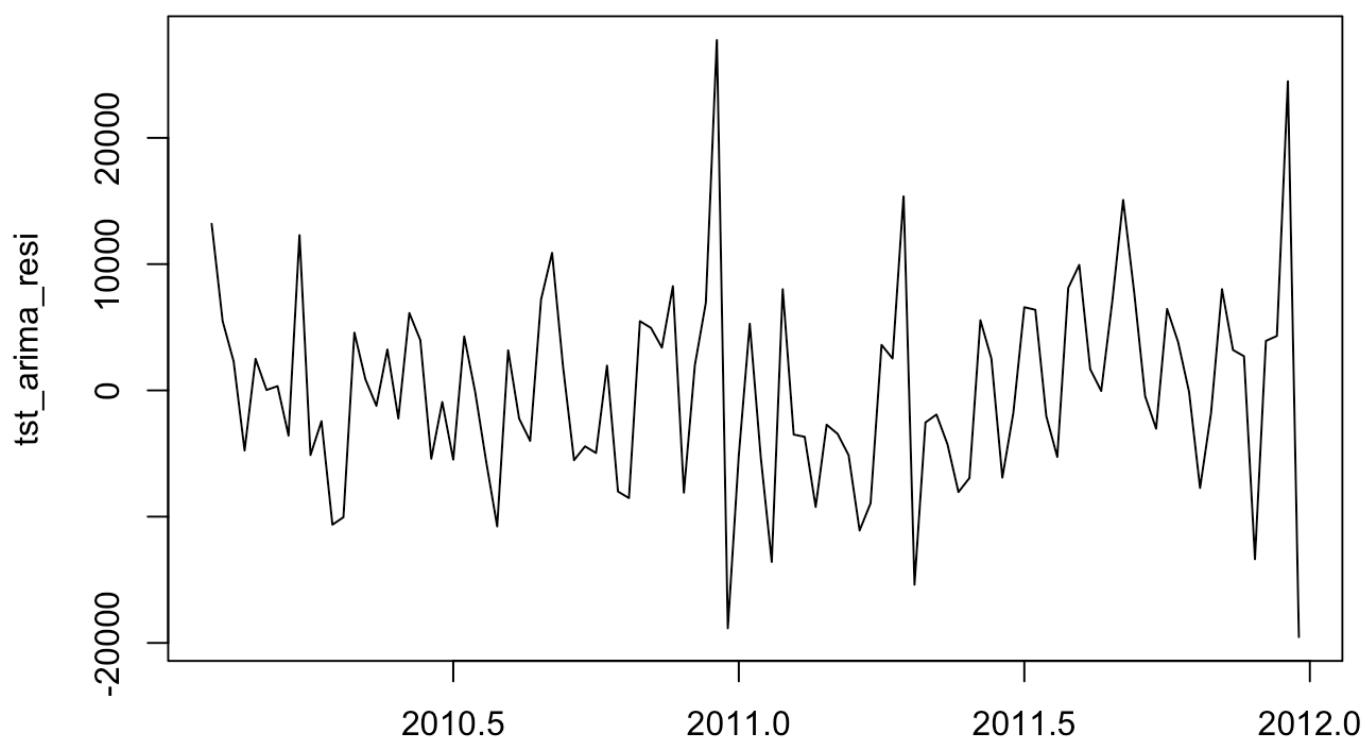
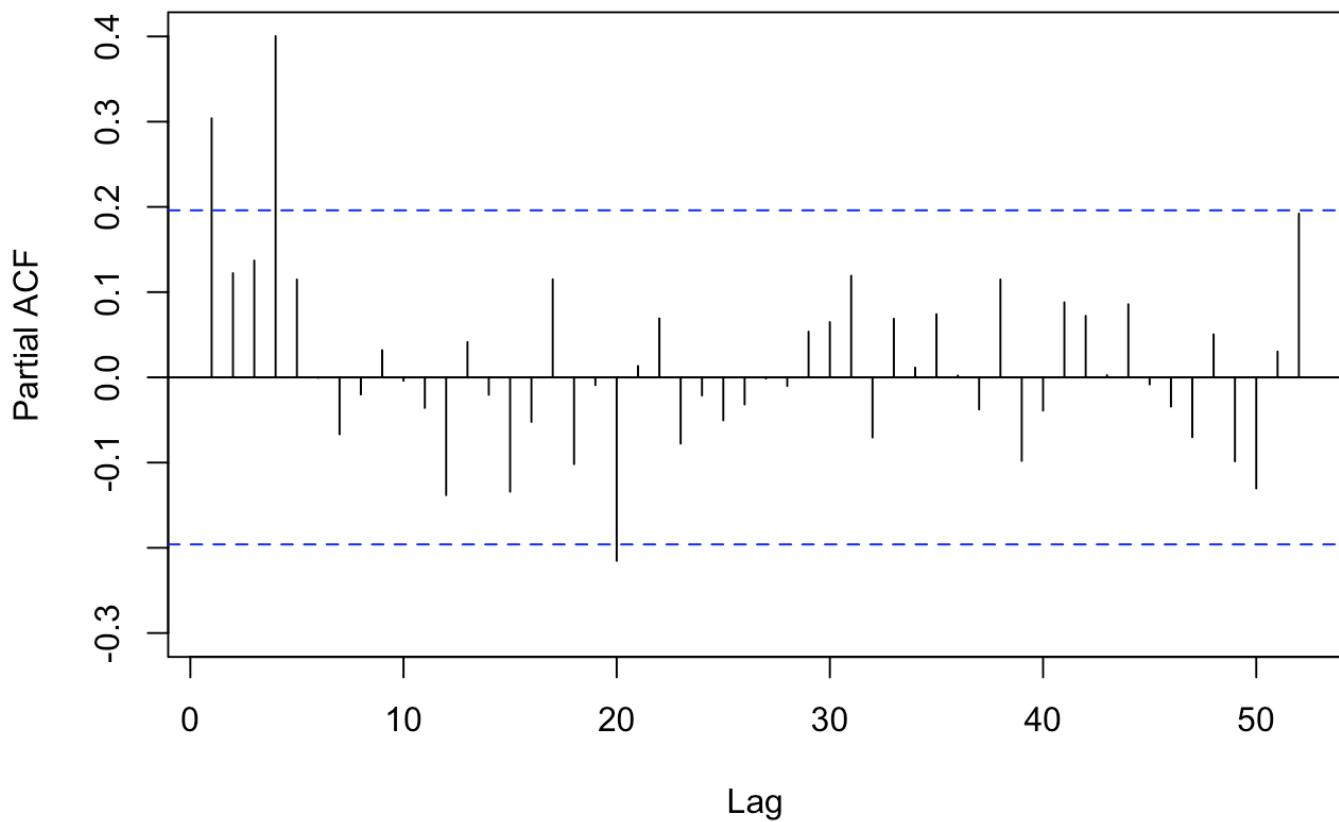
Time

Series train_sales

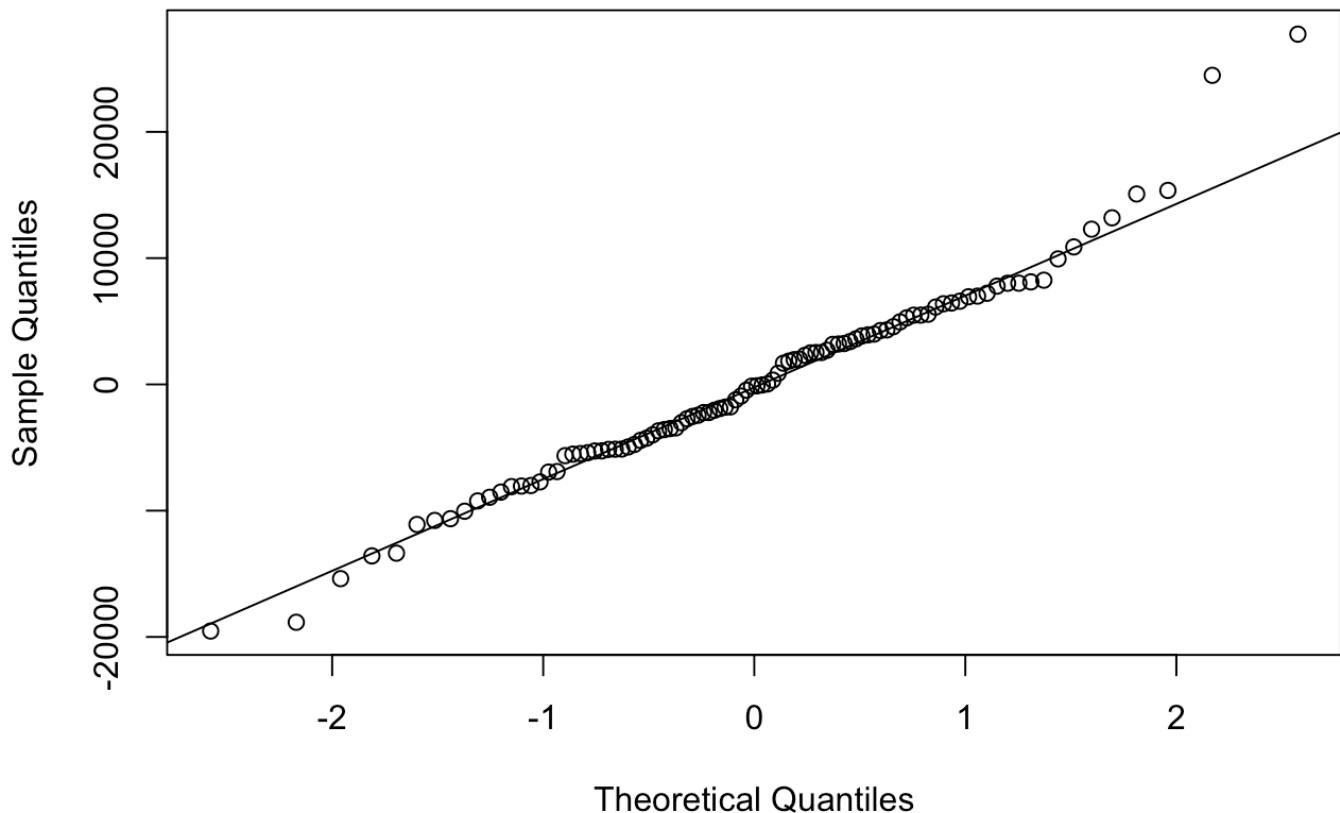
```
## [1] "Running the Arima Model with all regressors"  
## [1] "Running the Arima Model excluding CPI and Fuel Price regressors"  
## [1] "Running the ETS (Error, Trend, Seasonality) model"
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```
## Warning in ets(train_sales): I can't handle data with frequency greater  
## than 24. Seasonality will be ignored. Try stlf() if you need seasonal  
## forecasts.
```

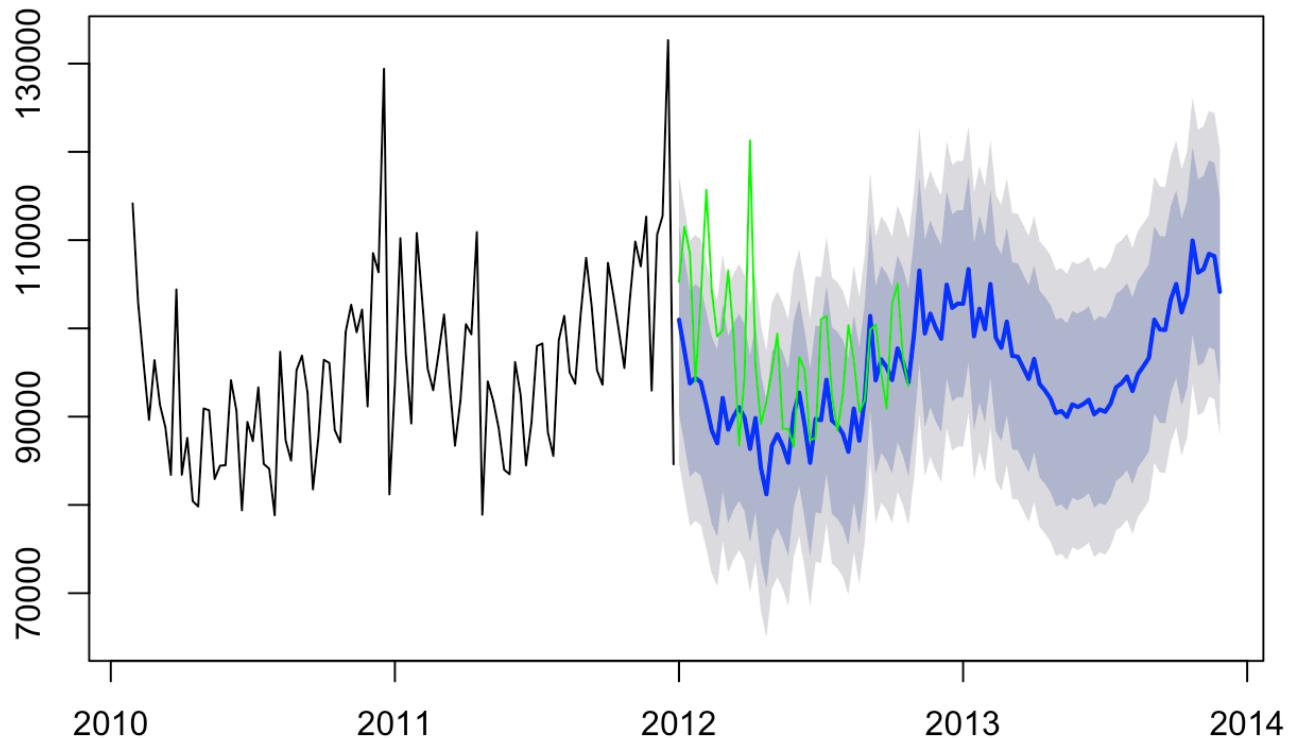

Original Time Series



Time

Normal Q-Q Plot

Prediction from Auto Arima for Weekly Sales



```
## [1] "25  out of  25  Completed"  
## [1] "100 % Completed"
```