

RCODE FOR TIMESERIES

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install.packages("forecast")
library("forecast")
library("tseries")
View(gas)
head(gas)
tail(gas)
plot(gas)
#####Converting into time series object#####
gas_ts <- ts(gas, frequency = 12, start = c(1956,1), end = c(1994,12))
plot(gas_ts)
gas_ts
View(gas_ts)
class(gas_ts)
start(gas_ts)
end(gas_ts)
frequency(gas_ts)
summary(gas_ts)
cycle(gas_ts)
plot.ts(gas_ts, main = "Monthly gas production in Australia", xlab = "Year", ylab = "ML")
seasonplot(gas_ts, year.labels = TRUE, year.labels.left = TRUE, col=1:40,pch=19,main =
"Monthly Gas Production in Australia")
monthplot(gas_ts, main = "Monthly Gas Production in Australia-monthplot", xlab ="Month",
ylab = "ML")
boxplot(gas_ts ~ cycle(gas_ts), xlab = "Month", ylab = "ML", main = "Monthly Gas
Production in Australia-Boxplot")
plot.ts(gas_ts/monthdays(gas_ts), main = "Monthly gas production in Australia", xlab =
"Year", ylab = "ML")
decompgas = decompose(gas_ts, type = "additive")
plot(decompgas)
decompgas
decompgas = decompose(gas_ts, type = "multiplicative")
plot(decompgas)
decompgas
deseasonal_gas = seasadj(decompgas)
plot(deseasonal_gas)
adf.test(gas_ts, alternative = "stationary")
acf(gas_ts)
acf(gas_ts, lag.max = 24)
pacf(gas_ts, lag.max = 24)
#####Differencing the timeseries data#####
count_d1 = diff(deseasonal_gas, differences = 1)
plot(count_d1)
adf.test(count_d1, alternative = "stationary")
Acf(count_d1, main='ACF for Differenced Series')
Pacf(count_d1, main='PACF for Differenced Series')
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#####splitting data#####
gasTStrain = window(deseasonal_gas, start=1956, end=c(1980,12))
gasTStest= window(deseasonal_gas, start=1981, end=c(1994,12))
#####Arima model#####
gasARIMA = arima(gasTStrain, order=c(0,1,0))
gasARIMA
tsdisplay(residuals(gasARIMA), lag.max=15, main='Model Residuals')
#####Autoarima model#####
autoarima1<-auto.arima(gasTStrain, seasonal=FALSE)
autoarima1
autoarima2<-auto.arima(gasTStrain, stationary=TRUE)
autoarima2
tsdisplay(residuals(autoarima1), lag.max=45, main='Auto ARIMA Model Residuals')
tsdisplay(residuals(autoarima2), lag.max=45, main='Auto ARIMA Model Residuals')
#Ljung box test
####H0: Residuals are independent####
####Ha: Residuals are not independent#####
library(stats)
Box.test(gasARIMA$residuals)
Box.test(autoarima1$residuals)
Box.test(autoarima2$residuals)
#####Forecasting with ARIMA MODEL#####
fcast <- forecast(gasARIMA, h=12)
plot(fcast)
fcast1 <- forecast(autoarima1, h=12)
plot(fcast1)

fcast2<- forecast(autoarima2, h=12)
plot(fcast2)
#####Accuracy of the Forecast#####
f5=forecast(gasARIMA)
accuracy(f5, gasTStest)
f6=forecast(autoarima1)
accuracy(f6, gasTStest)
f7=forecast(autoarima2)
accuracy(f7, gasTStest)

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