**LearnR**

**Okahandja water demand forecasting Using R**

Lillian Pazvakawambwa , 14 June 2017

> library(foreign)

> waterdemand=read.spss(file.choose(),to.data.frame=T)

>Dtimeseries=ts(waterdemand,frequency=1,start=c(1967))

> Dtimeseries

> plot.ts(Dtimeseries)

>acf(Dtimeseries)

#Time Series Decomposition

>Dseriescomponents <- decompose(Dtimeseries)

>Dseriescomponents

>plot(Dseriescomponents)

# The estimated values of the seasonal, trend and irregular components are now stored in variables Dseriescomponents$seasonal, Dseriescomponents$trend and Dseriescomponents$random. e.g.

> Dseriescomponents$seasonal

#Exponential smoothing with Holt Winters Method

> DtimeseriesHWforecasts=HoltWinters(Dtimeseries,gamma=FALSE)

> DtimeseriesHWforecasts

> DtimeseriesHWforecasts$fitted

> plot(DtimeseriesHWforecasts)

> DtimeseriesHWforecasts$SSE

> library("forecast")

> DtimeseriesHWforecasts=forecast.HoltWinters(Dtimeseriesforecasts,h=36)

> DtimeHWseriesforecasts

> plot.forecast(DtimeHWseriesforecasts)

> acf(DtimeHWseriesforecasts$residuals)

> Box.test(DtimeHWseriesforecasts$residuals,type="Ljung-Box")

> plot.ts(DtimeHWseriesforecasts$residuals)

**# Box Jenkins ARIMA Modelling**

> library(foreign)

> waterdemand=read.spss(file.choose(),to.data.frame=T)

> Dtimeseries=ts(waterdemand,frequency=1,start=c(1967))

> plot.ts(Dtimeseries)

> Dtimeseriesdiff1=diff(Dtimeseries, differences=1)

> plot.ts(Dtimeseriesdiff1)

> acf(Dtimeseriesdiff1)

> pacf(Dtimeseriesdiff1)

> library (forecast)

> auto.arima(Dtimeseries)

> Dtimeseriesarima=auto.arima(Dtimeseries)

> Dtimeseriesforecasts=forecast.Arima(Dtimeseriesarima,h=36)

> plot.forecast(Dtimeseriesforecasts)

> Dtimeseriesforecasts

> acf(Dtimeseriesforecasts$residuals)

> Box.test(Dtimeseriesforecasts$residuals,type="Ljung-Box")

> plot.ts(Dtimeseriesforecasts$residuals)

> hist(Dtimeseriesforecasts$residuals)

>qqnorm(Dtimeseriesforecasts$residuals)