Introduction to R

Forecasting Techniques 2017-2018



zabbeta@fsu.gr | katerina@fsu.gr





- ✓ Read & Plot Data
- ✓ Decompose
- ✓ Forecast
- ✓ Overview & Export

Prepare Time-Series

- ✓ Create a numeric vector
- ✓ Generate time-series
- ✓ Plot data



```
x<-c(7437115,      7483934,  7551117,
        7647675,  7743831,  7824909,
        7912398,  7996861)

xts<-ts(x,frequency = 3) #more at help

plot(x, type="l", main=example, col =
"blue")
```




Decomposition

- ✓ Decomposition of time-series
- ✓ Export seasonal indices
- ✓ Check results from seasonalizing the deseasonilized time-series



```
#decomposition of xts
xts.decomp<-decompose(xts, type =
c("multiplicative") )

#take seasonal indices
xts.decomp$seasonal

#Take the deseasonilized ts and
#seasonalize
xts.deseason<-
seasadj(decompose(xts,"multiplicative"))

xts.seasonalindices<-
xts.decomp$seasonal[(1:8)]

xts.deseason*(xts.seasonalindices)
```

Forecast (1/2)

- ✓ Produce naive forecast
- ✓ Observe results summary
- ✓ Produce damped forecast

```
xts.naive<-naive(xts, h=3)
xts.naive$mean
plot(xts.naive)

mean(xts)
summary(xts.naive)
plot(summary(xts.naive))

#damped
xts.damped<-holt(xts, h=3,
level=c(80,95),
initial=c("optimal","simple"),damped=TRU
E, alpha=NULL, beta=NULL)

xts.damped$mean
xts.damped$residuals
xts.damped$fitted
```





Forecast (2/2)

- ✓ Produce damped forecast
- ✓ Observe results summary

```
forecasingHorizon<-3
aaperiod=c(1: length(xts))
#dianusma time (1, 2, 3,4,5,...,26

aaperiodforecast=c((length(xts)+1):(
th(xts)+forecasingHorizon))
#dianusma provlepsewn

lrlresults <- lm(formula = xts ~
aaperiod)
#ti mpainei sto arg formula tis lm

a=lrlresults$coefficients[1]
b=lrlresults$coefficients[2]

Insamplelrl<- a+b*aaperiod
Forecastlrl<- a+b*aaperiodforecast
#it is just a numeric vector

#Forecast with Holt and SES too!
```





Results Summary & Export

- ✓ Collect forecast results in matrix
- ✓ Export to file



```
#make a table to export
forecasttable<-matrix(data=NA, nrow=5,
ncol=3)
forecasttable[1,] <- xts.naive$mean
forecasttable[2,] <- xts.ses$mean
forecasttable[3,] <- xts.holt$mean
forecasttable[4,] <- xts.damped$mean
forecasttable[5,] <- Forecastlrl

write.table(forecasttable, file =
"path/to/seminaR0.csv", append = FALSE,
quote = TRUE, sep = ",", row.names =
TRUE, col.names = TRUE,dec = ".")
```




Thank you!

Forecasting Techniques 2017-2018



zabbeta@fsu.gr | katerina@fsu.gr