Exercise 8 - NARMAX Prediction of Cryptocurrency and Forex FTS (in R)

November 22, 2017

1. Cryptocurrency

NARMAX model performance: 0.54

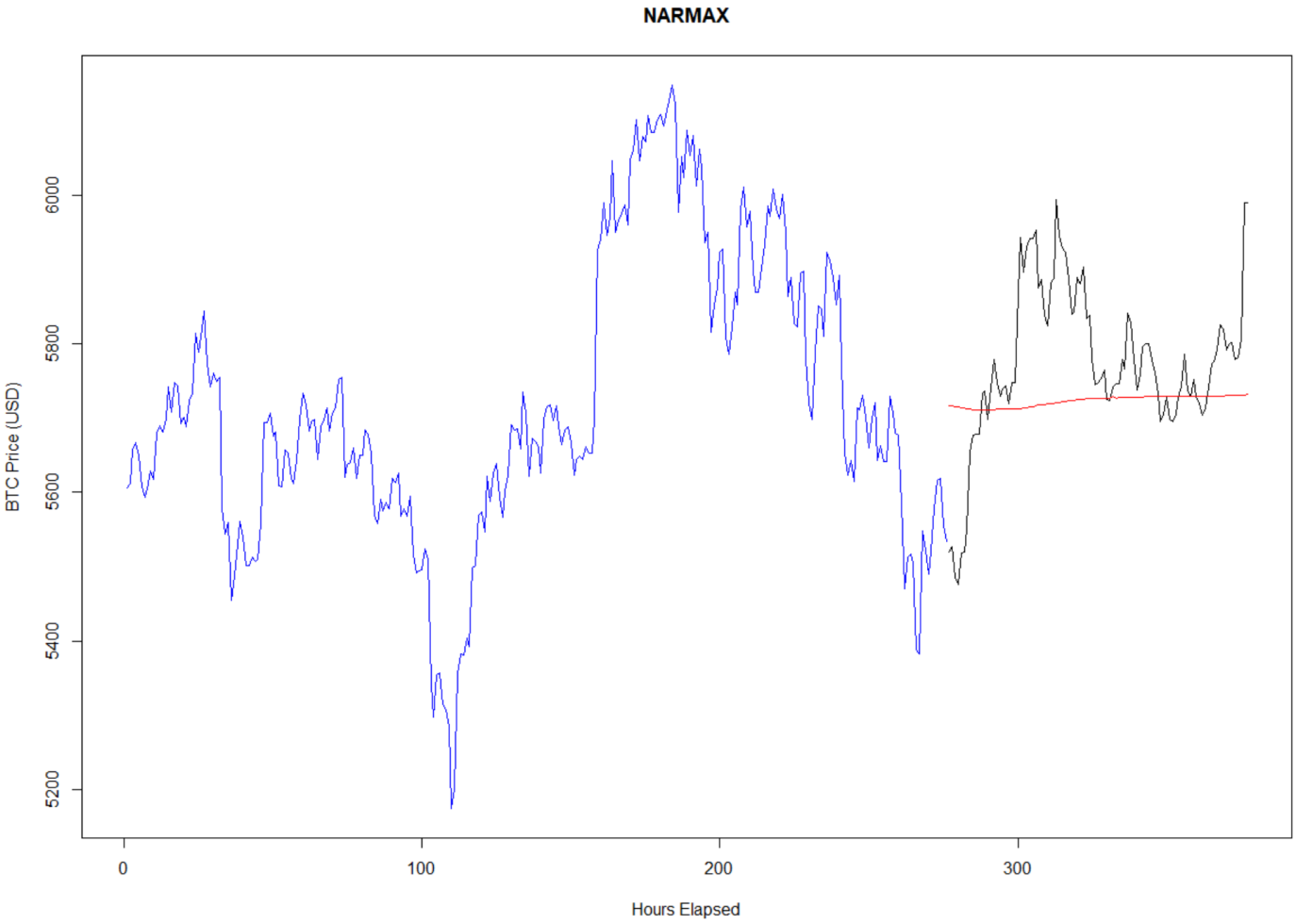

Figure 1.1 - BTC/USD Prediction via NARMAX model

2. Forex

NARMAX model performance: 0.55

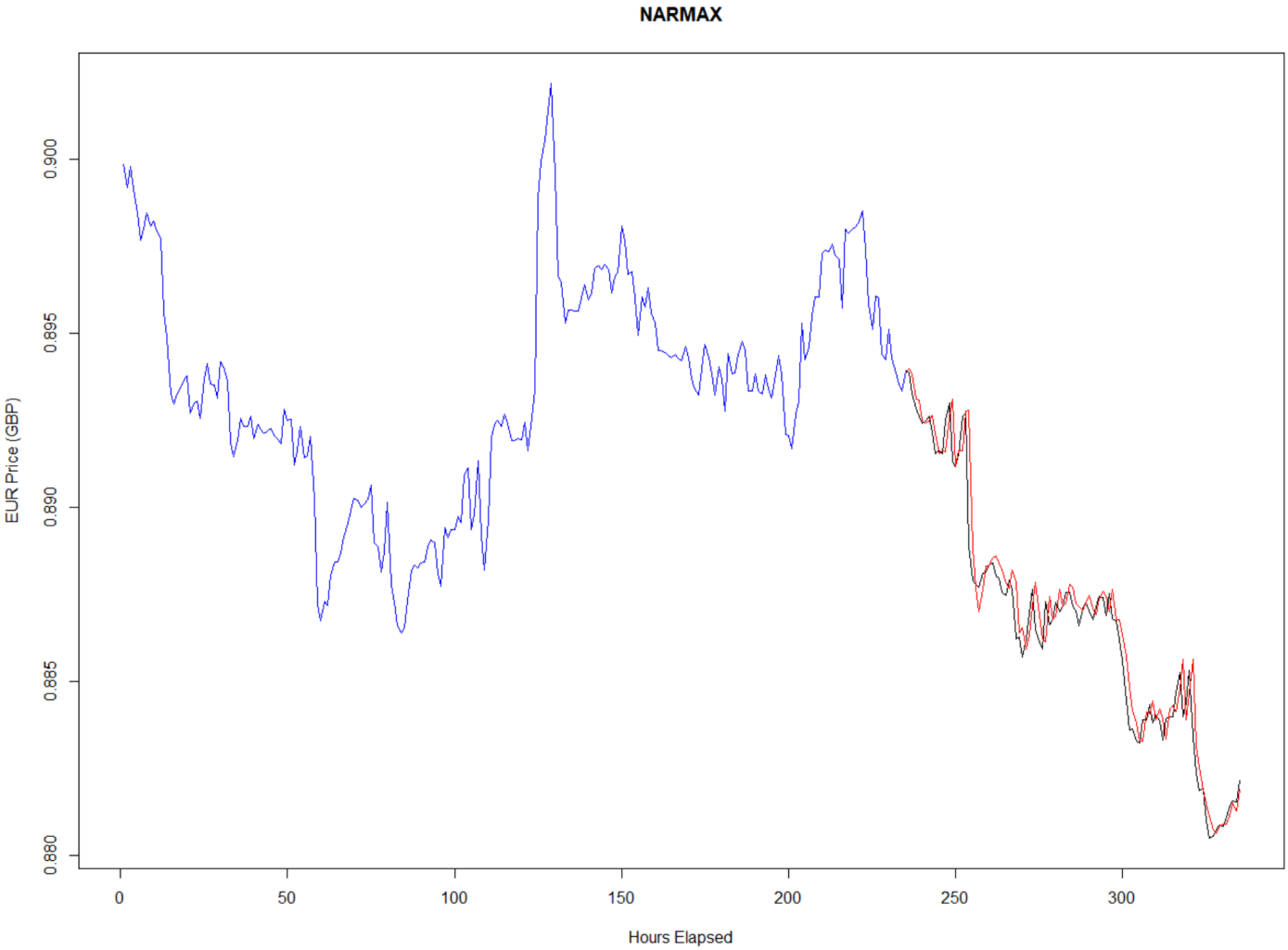

Figure 1.2 - EUR/GBP Prediction via NARMAX model

R Script used:

```
#Author: Thomas Hollis
#Subject: Bachelor Thesis

#1. Package & Data Import
library(tsDyn)
data <- read.csv("R/BTC.csv")

#2. Data Split

data_train <- data[1:276,2]
data_test <- data[277:377,2]

predictions <- matrix(0,1,101)
count = integer(100)

for (i in 1:101)
{
  narxBTC <- nnetTs(data_train, m=5, size = 10, steps = 1)
  predictions[i] <- predict(narxBTC)
  data_train <- c(data_train, data_test[i])

  if(i >= 2)
  {
    if((predictions[i] > data_test[i-1] && data_test[i] > data_test[i-1]) ||
(predictions[i] < data_test[i-1] && data_test[i] < data_test[i-1]))
    {
      count[i-1] = 1
    }
  }
}

values <- seq(277,377,1)
plot(data_train[1:276], ylim=range(data_train), xlim=range(1,377), xlab = "Hours
Elapsed", ylab = "BTC Price (USD)", type = "l", col = "blue", main = "NARMAX")
par(new = TRUE)
plot(x = values, y = data_test, ylim=range(data_train), xlim=range(1,377), axes =
FALSE, xlab = "", ylab = "", col = "black", type = "l")
par(new = TRUE)
plot(x = values, y = predictions, ylim=range(data_train), xlim=range(1,377), axes =
FALSE, xlab = "", ylab = "", type = "l", col = "red")
par(new = TRUE)

sum(count)/100
```