Holt Winter and Exponential Smoothing Method on INR vs USD

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May 9, 2016

R Markdown

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```
daily = read.csv("daily.csv")
daily_rates = daily[,2]
daily = rev(daily_rates)
daily.ts = ts(daily, freq=365)
plot.ts(daily.ts)
daily.decomp = decompose(daily.ts)

library(forecast)
```

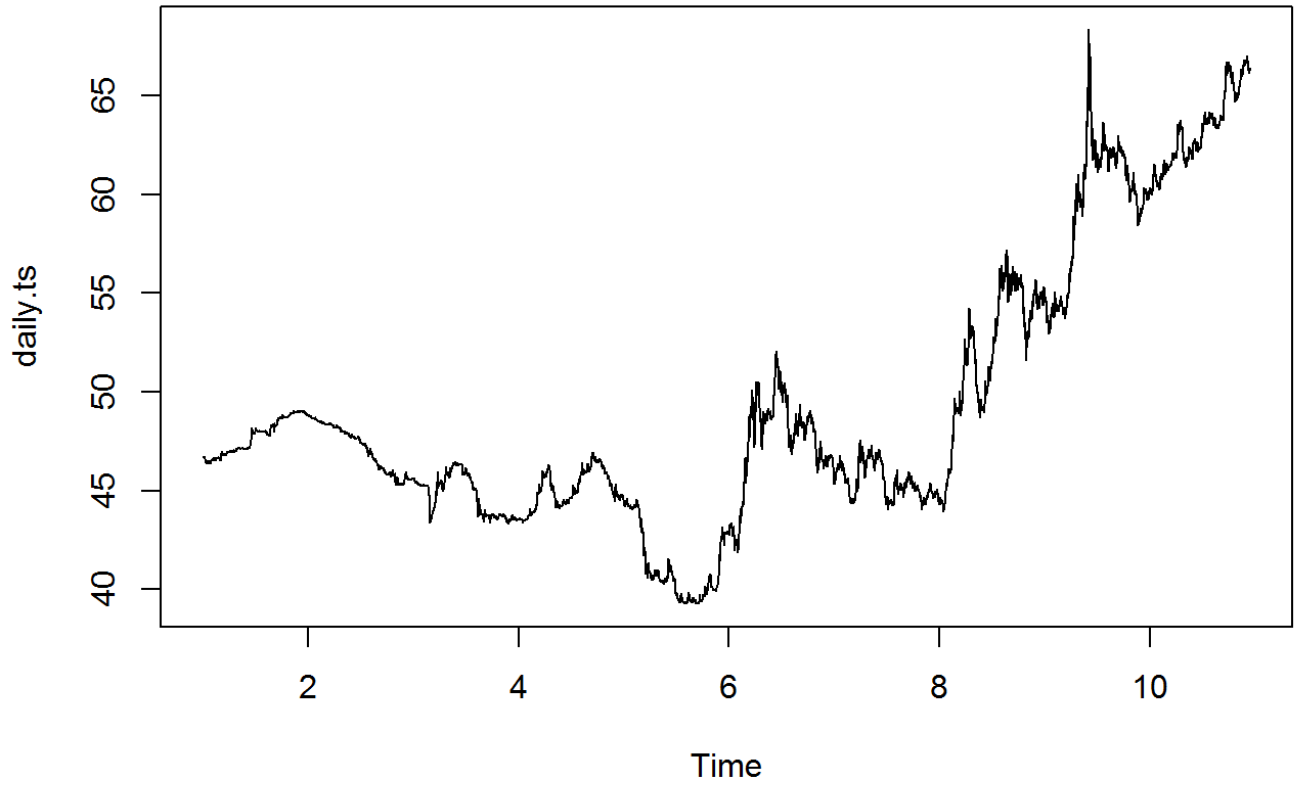
```
## Loading required package: zoo
```

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

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

```
## Loading required package: timeDate
```

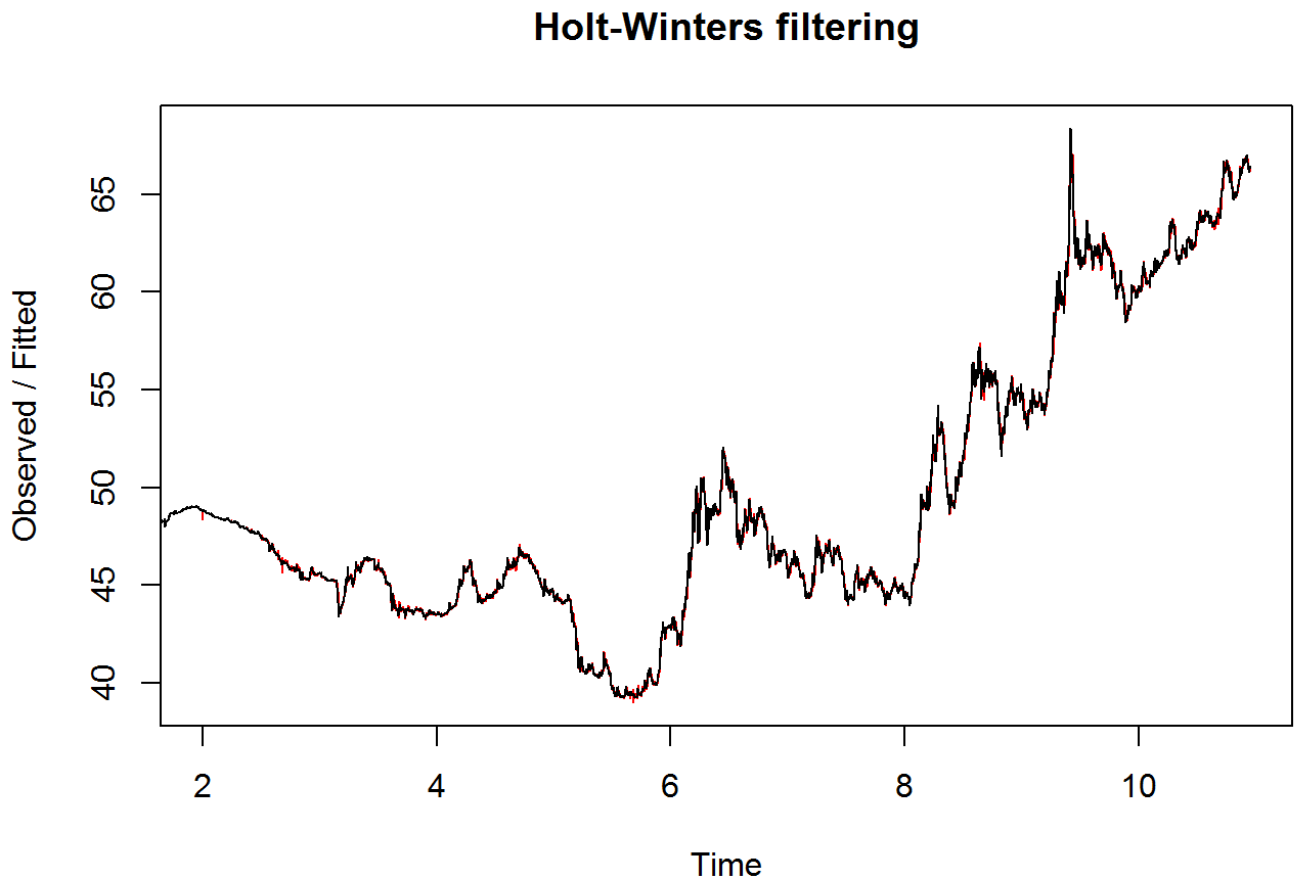
```
## This is forecast 7.1
```



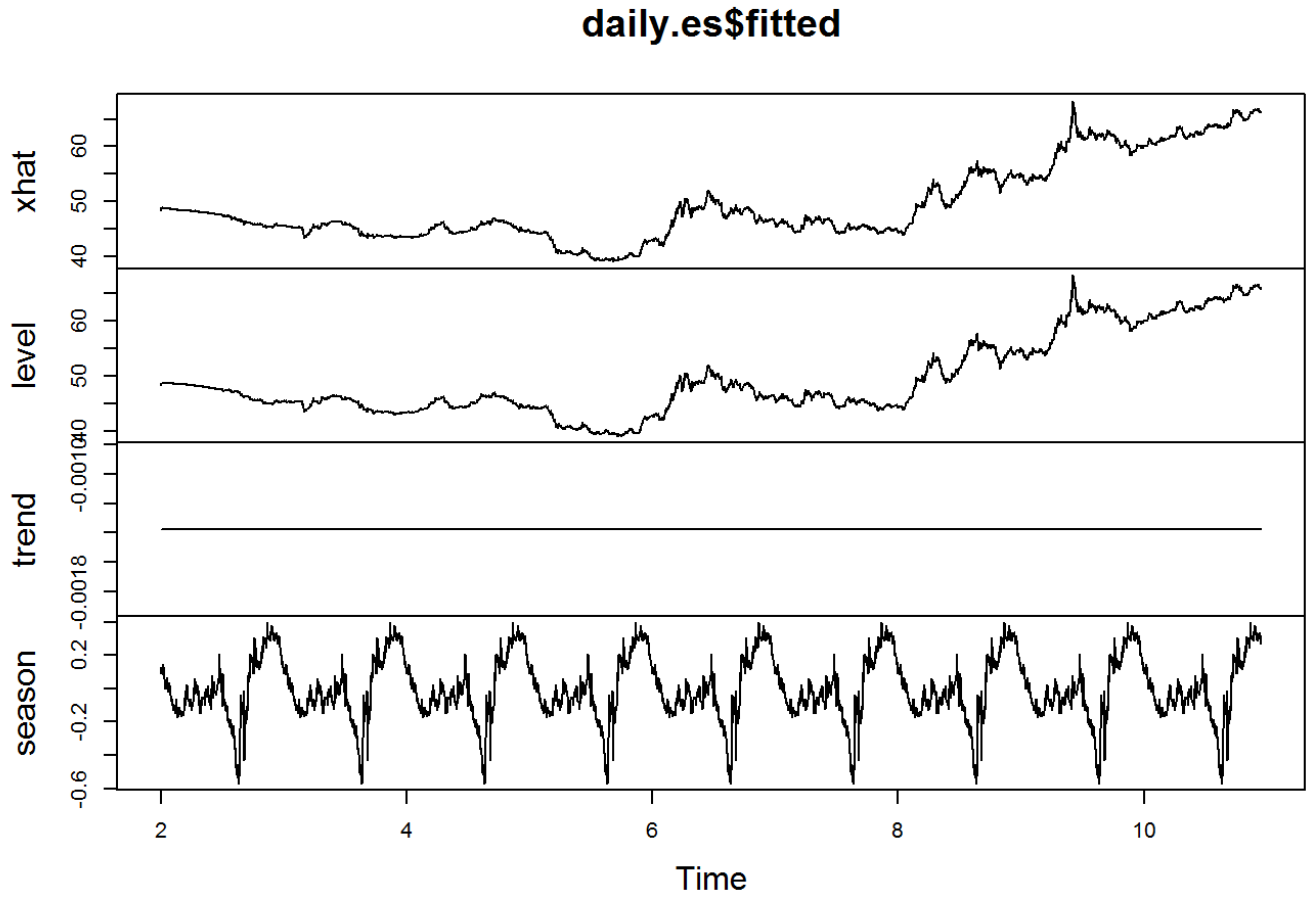

```
# exponential smoothing
daily.es = HoltWinters(daily.ts, beta=0, gamma=0)
head(daily.es$coefficients)
```

```
##           a           b          s1          s2          s3
## 66.054934544 -0.001375721  0.270547945  0.279890411  0.319561644
##          s4
##  0.289698630
```

```
plot(daily.es)
```



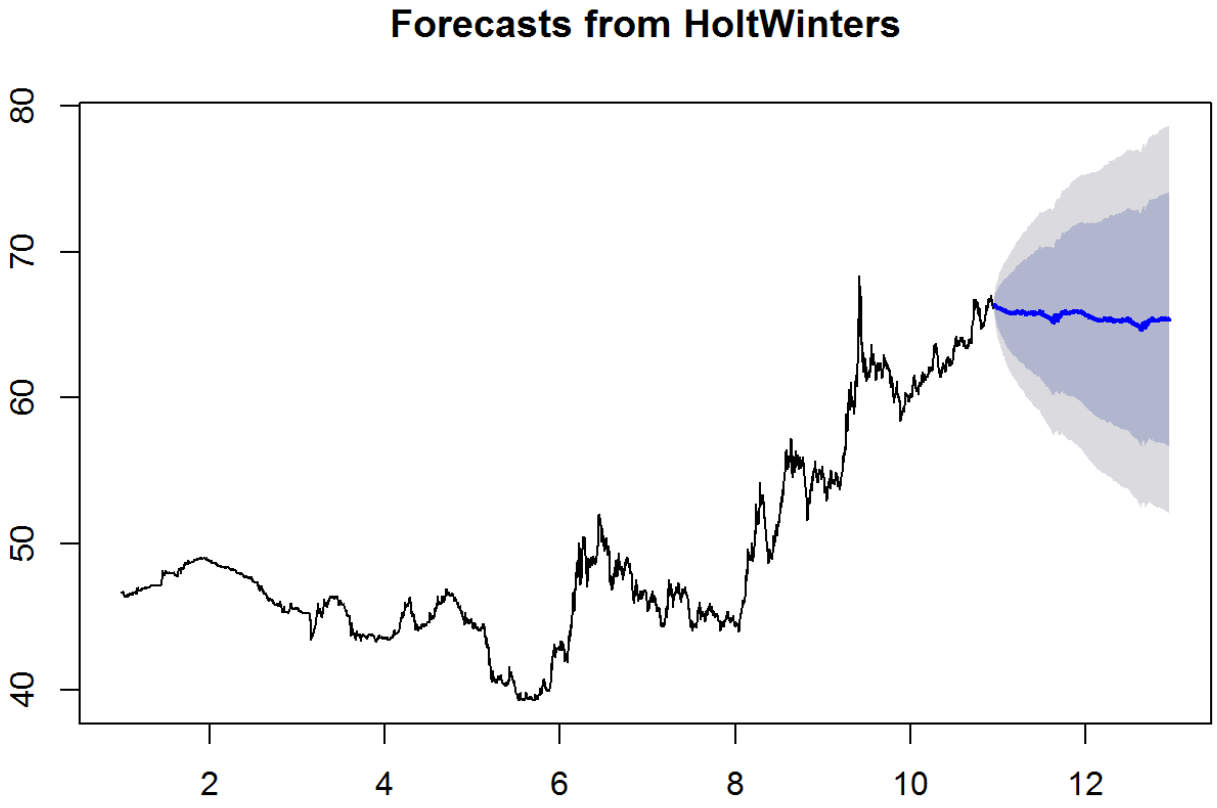

```
plot(daily.es$fitted)
```



```
daily.es$SSE
```

```
## [1] 205.3159
```

```
daily.predict1 = forecast(daily.es)
plot(daily.predict1)
```



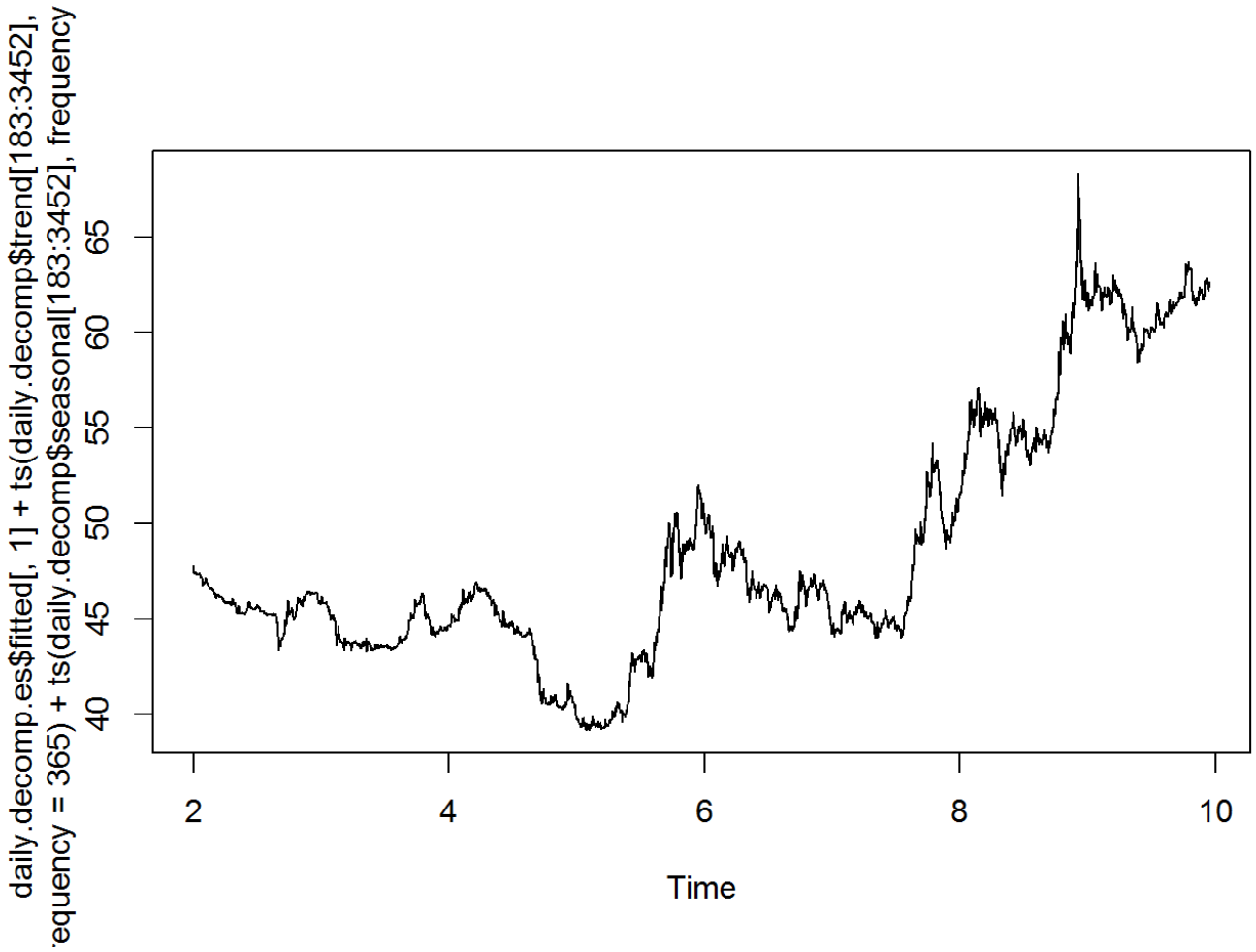

```
# removing trend and season, exponential smoothing
daily.decomp.es = HoltWinters(ts(daily.decomp$random[183:3452],frequency = 365), beta =
0, gamma = 0)
head(daily.decomp.es$coefficients)
```

```
##           a           b          s1          s2          s3
## -0.817199684 -0.001712649 -0.754913452 -0.593486907 -0.615436478
##          s4
## -0.560642725
```

```
# For checking -
head(daily.decomp.es$x-daily.decomp$random[183:3452])
```

```
## [1] 0 0 0 0 0 0
```

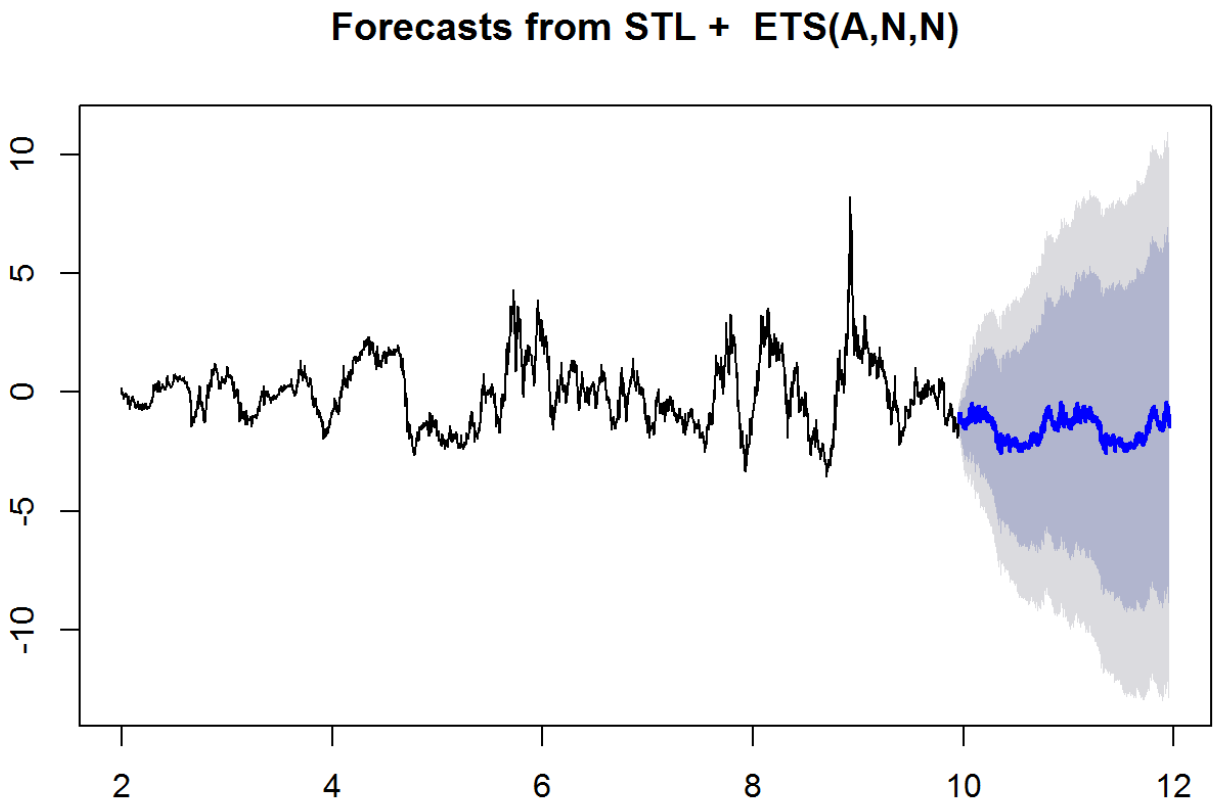
```
#final
plot(daily.decomp.es$fitted[,1]+ts(daily.decomp$trend[183:3452],frequency = 365)+ts(dai
ly.decomp$seasonal[183:3452], frequency = 365))
```



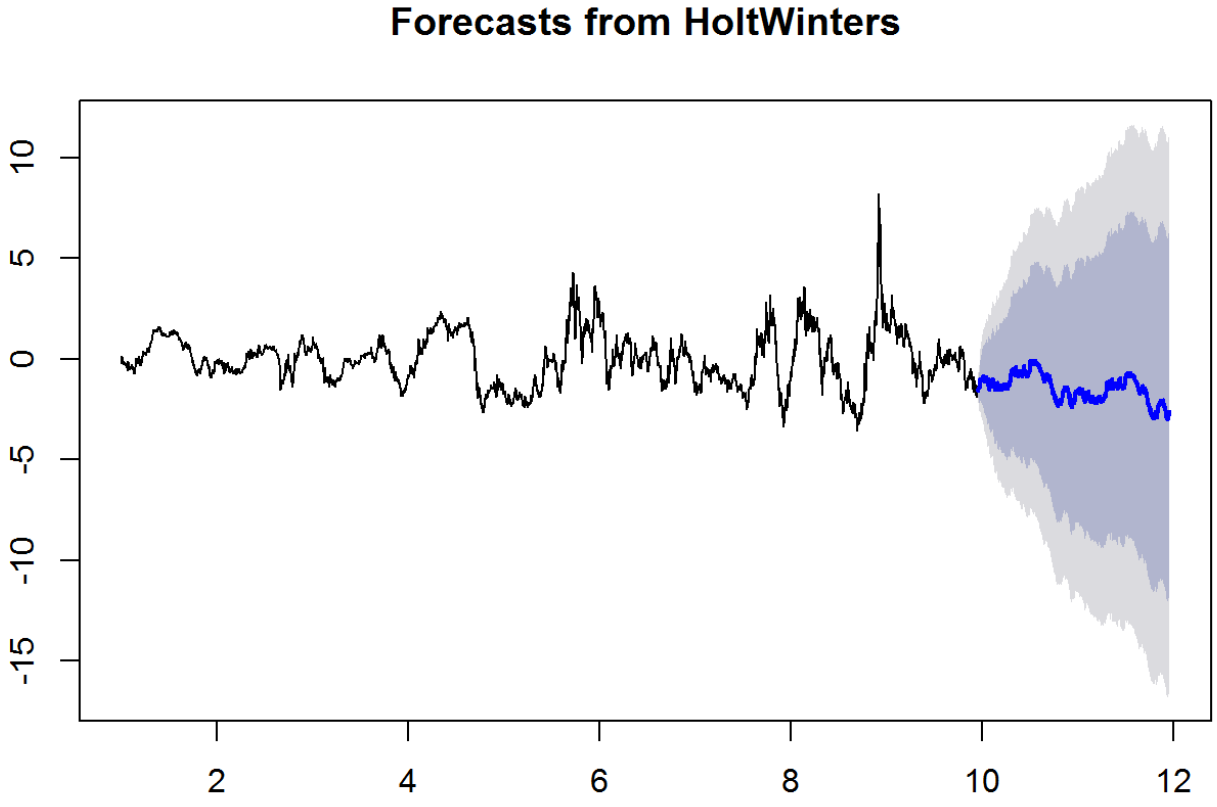

```
daily_afterSmoothing = daily.decomp.es$fitted[,1]+ts(daily.decomp$trend[183:3452],frequ
ency = 365)+ts(daily.decomp$seasonal[183:3452], frequency = 365)
daily.decomp.es$SSE
```

```
## [1] 198.6921
```

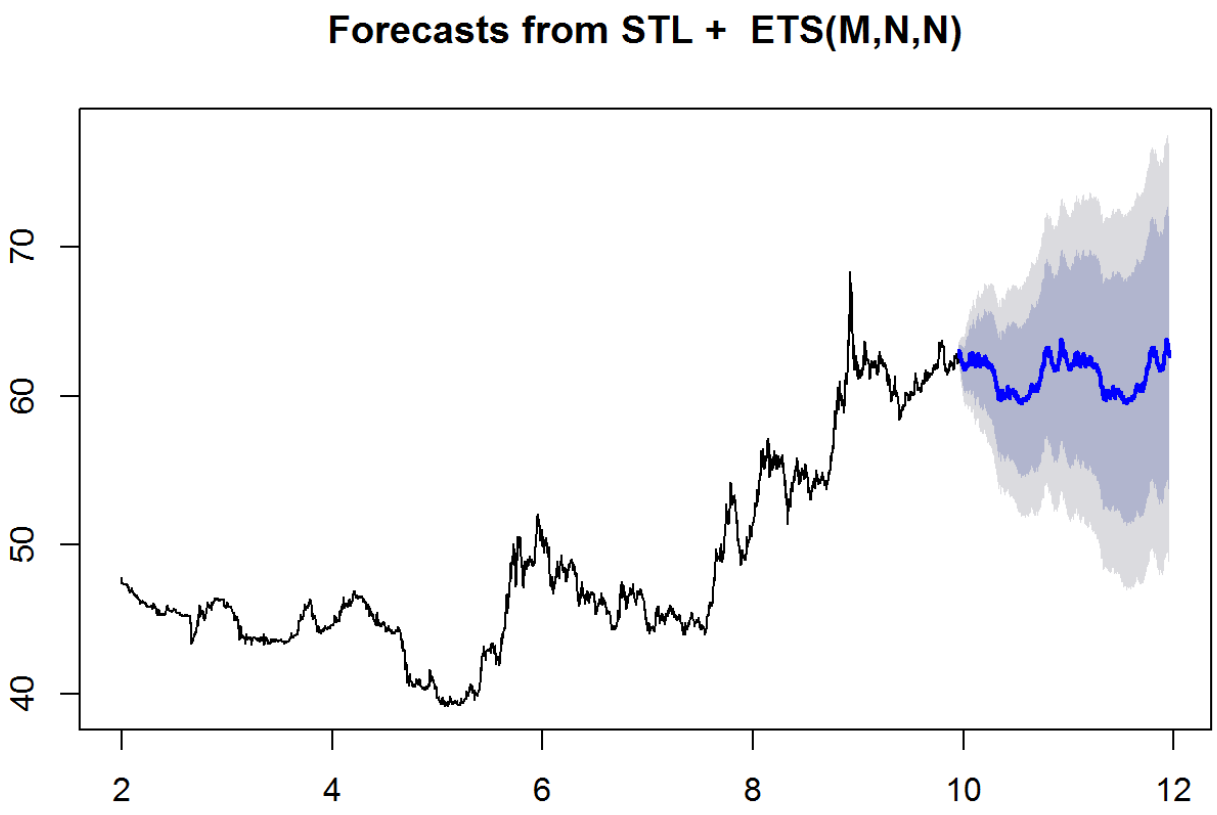
```
#par(mfrow =c(3,1))
daily.predict2 = forecast(daily.decomp.es$fitted[,1])
daily.predict3 = forecast(daily.decomp.es)
daily.predict4 = forecast(daily_afterSmoothing)
plot(daily.predict2)
```



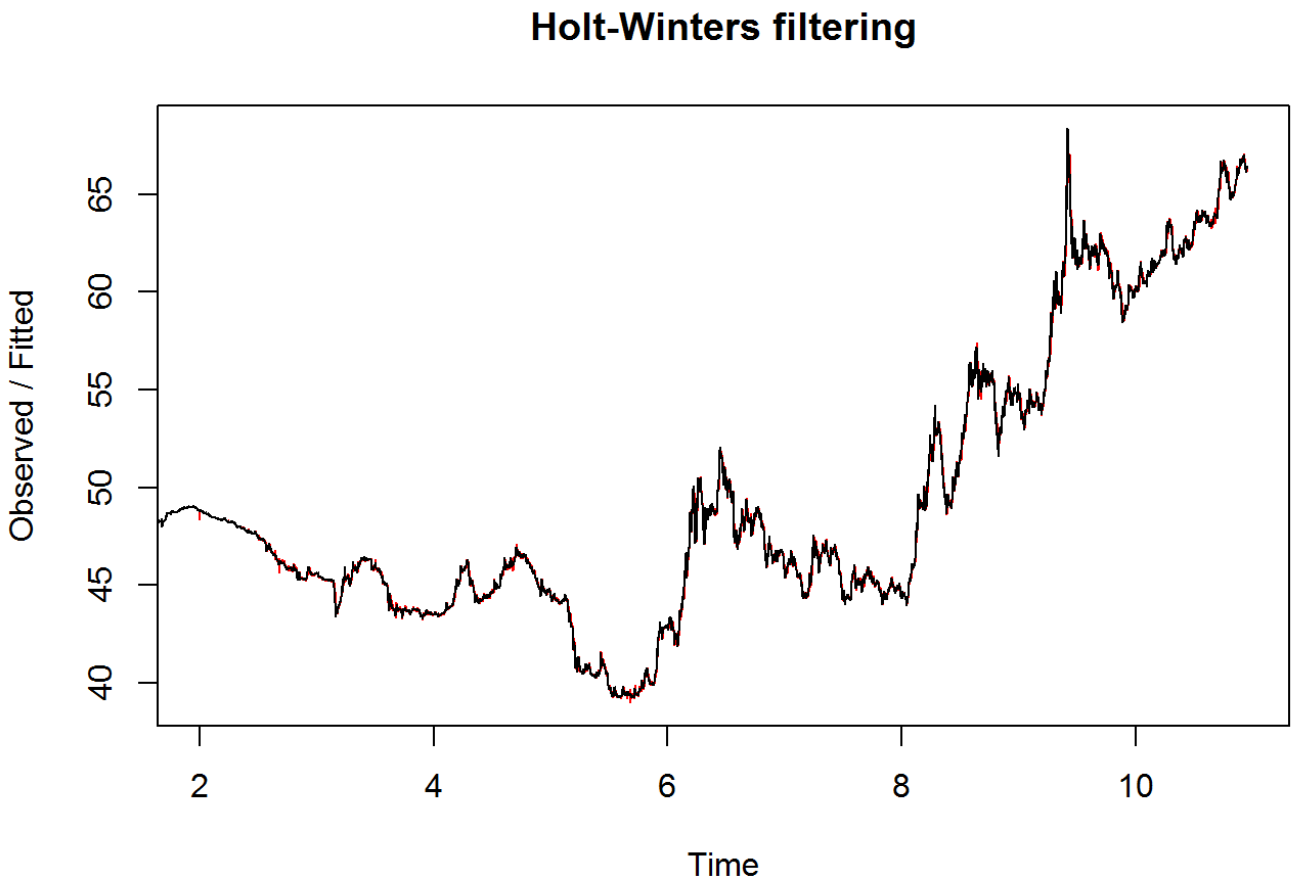

```
plot(daily.predict3)
```



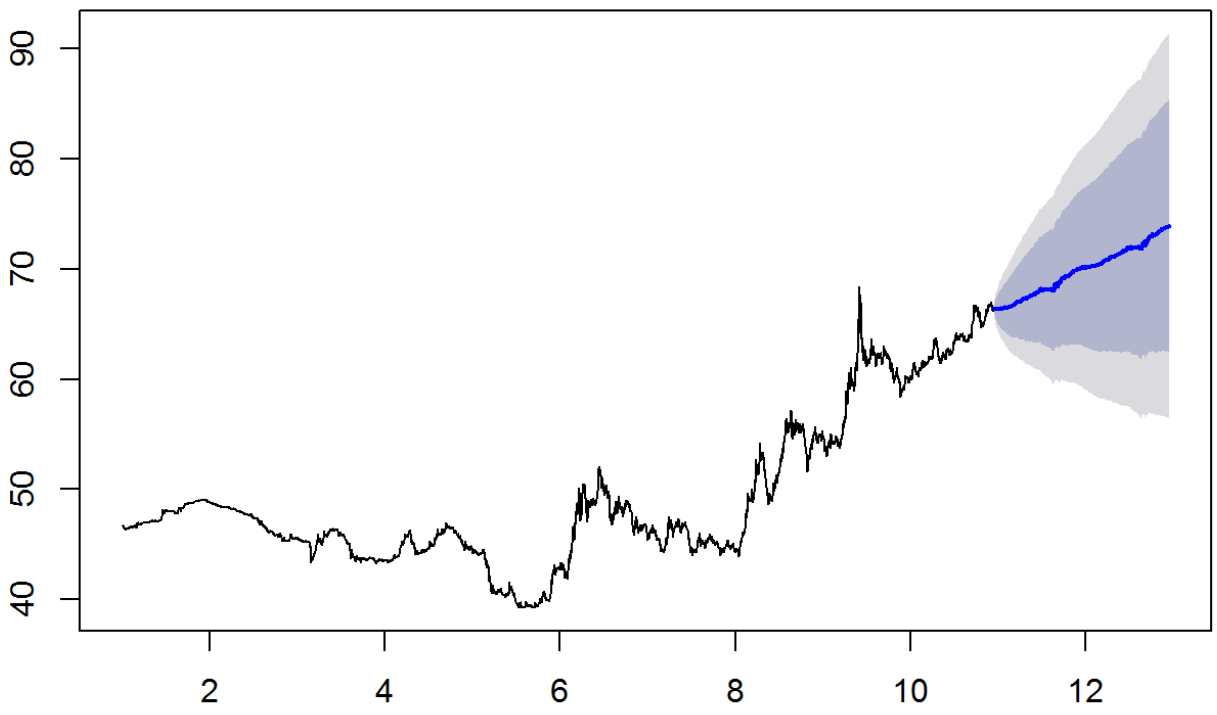
```
plot(daily.predict4)
```



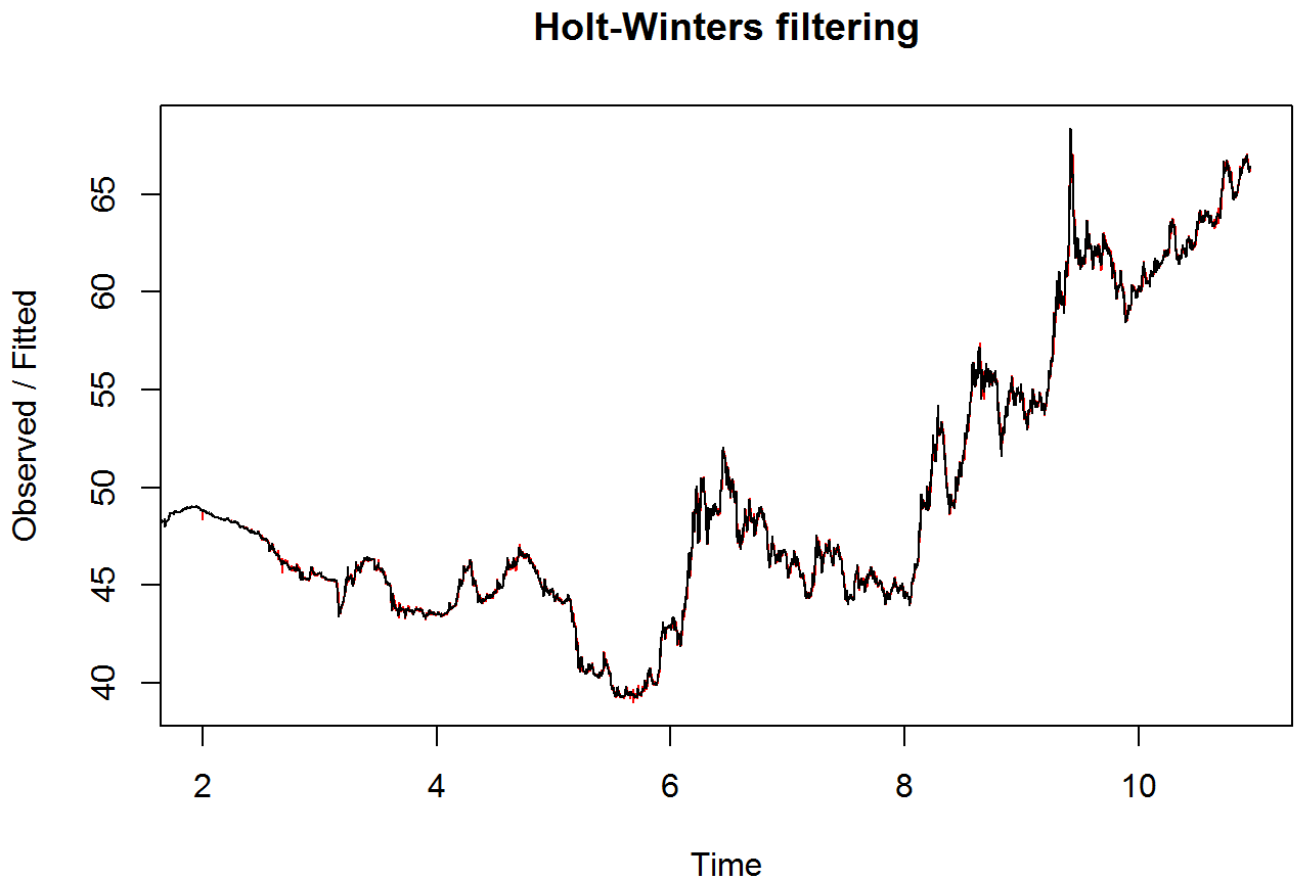

```
#par(mfrow =c(4,1))
data.hw4 = HoltWinters(daily.ts, seasonal = "additive")
plot(data.hw4)
```



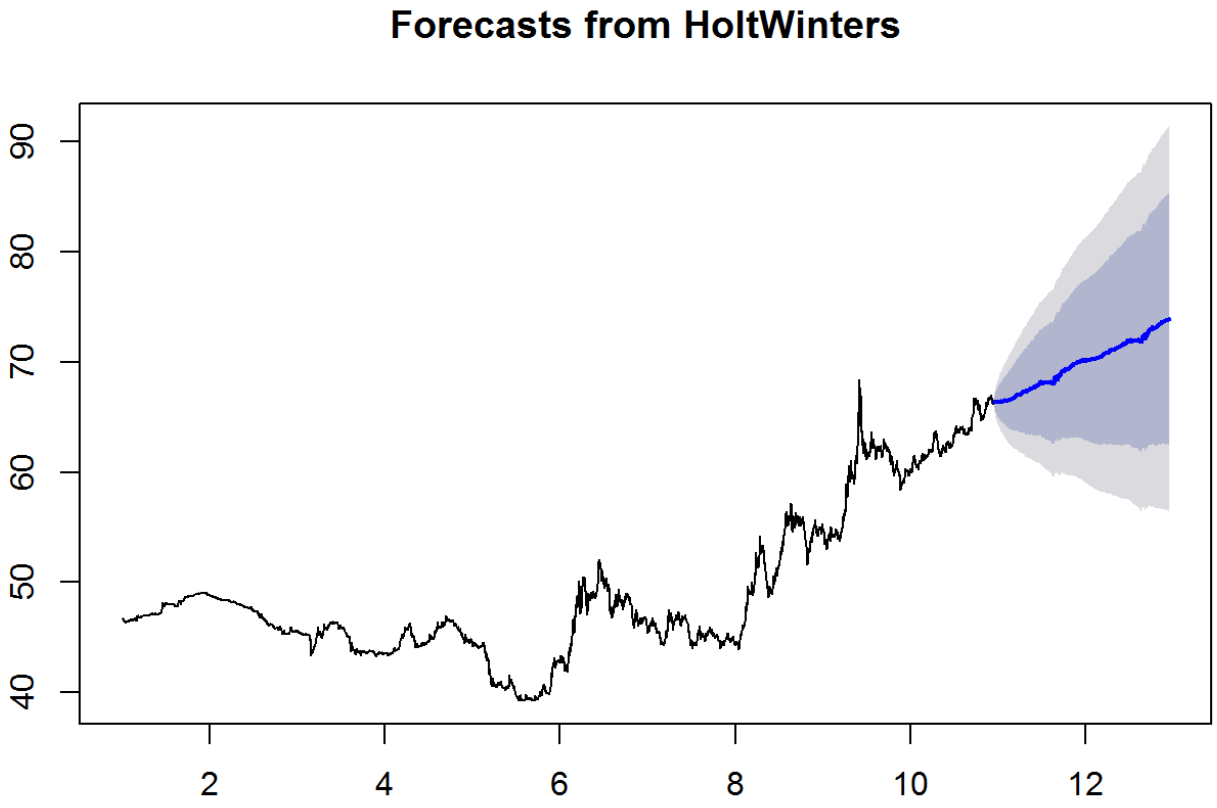

```
data.predict1 = forecast(data.hw4)
plot(data.predict1)
```




```
daily.hw4 = HoltWinters(daily.ts, seasonal = "additive")
plot(daily.hw4)
```

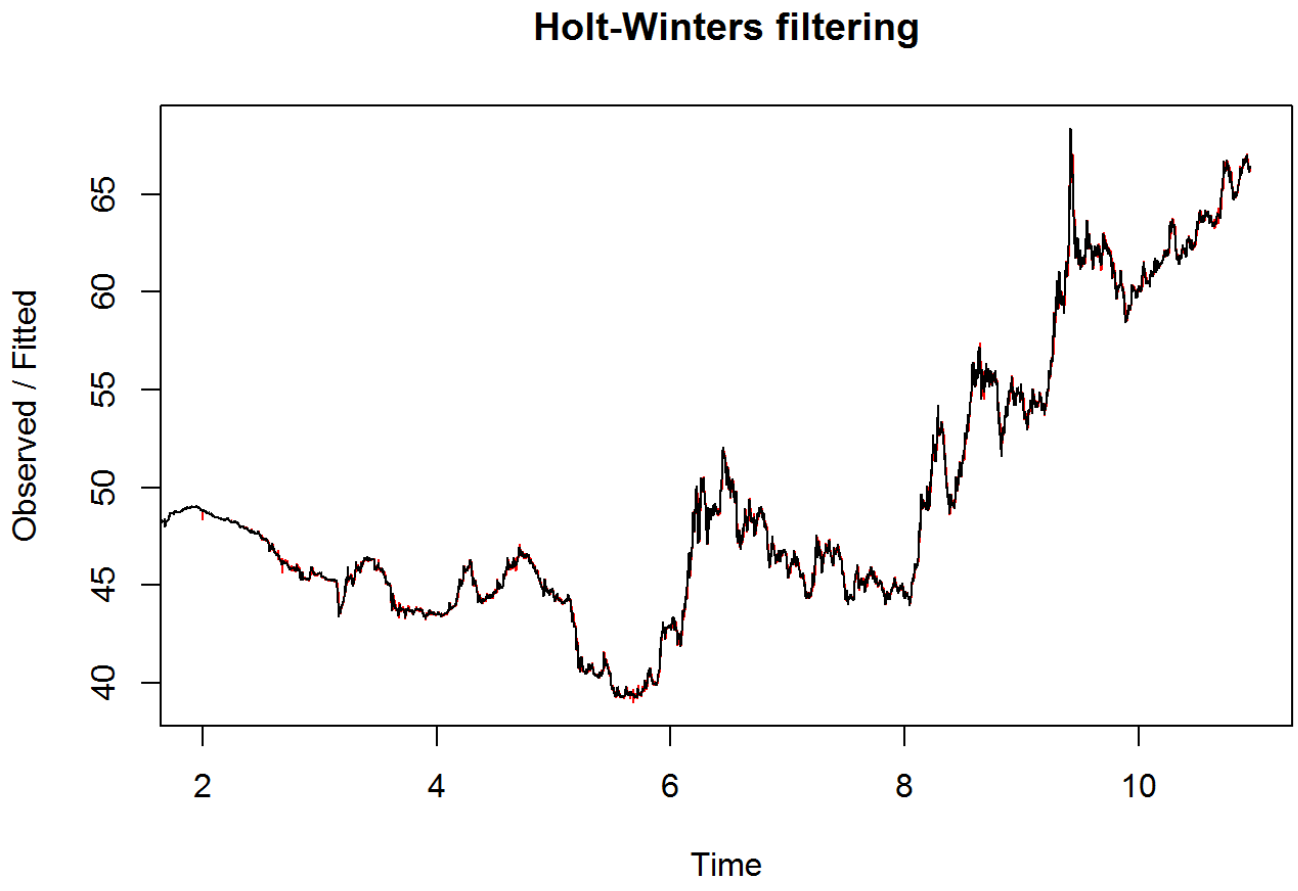



```
data.predict1 = forecast(daily.hw4)
plot(data.predict1)
```

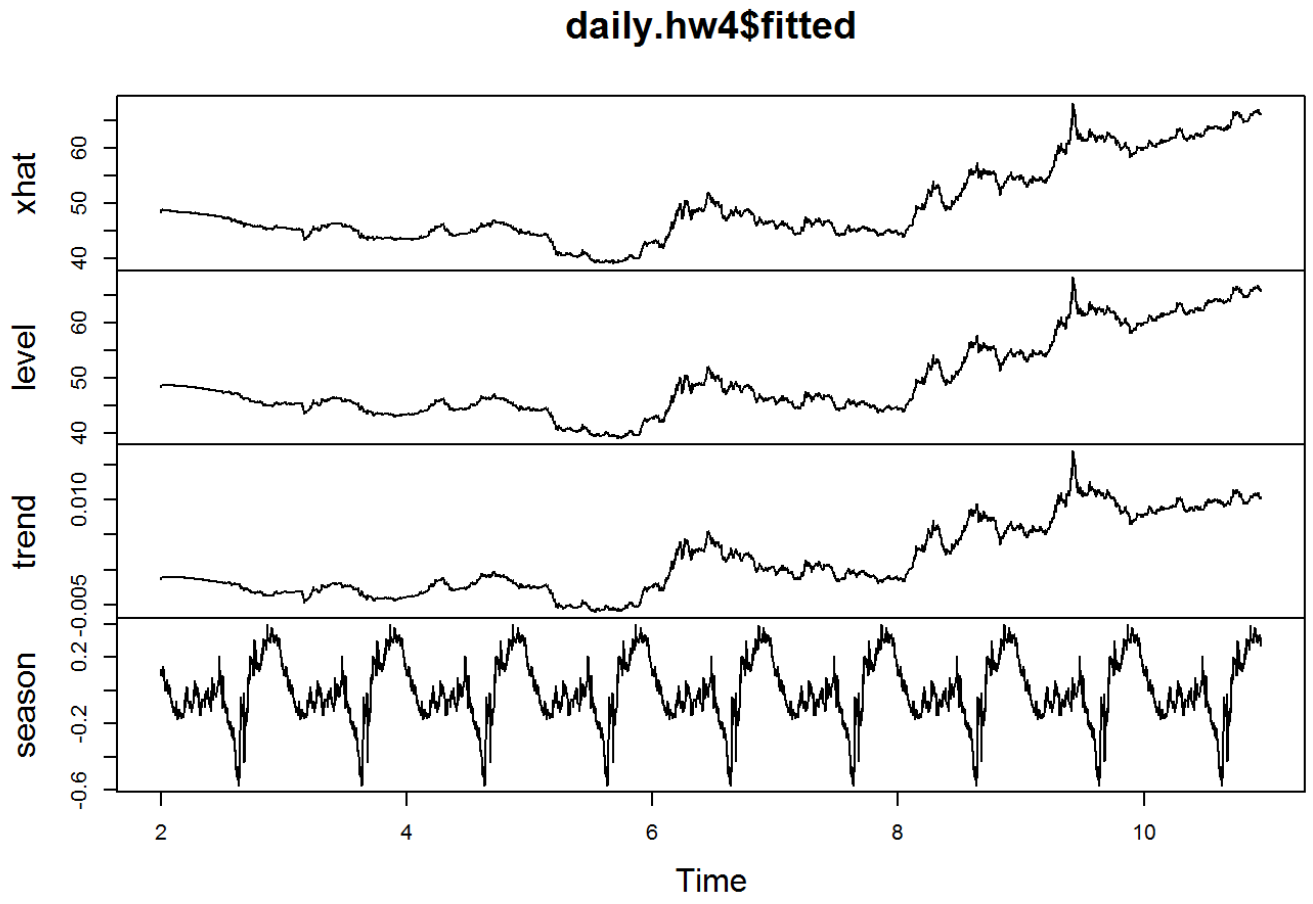



```
 # plot(daily.hw4$fitted)

#par(mfrow =c(2,1))
plot(daily.hw4)
plot(data.hw4)
```




```
#par(mfrow =c(1,1))
plot(daily.hw4$fitted)
```




```
plot(data.hw4$fitted)
```