6_comparison_SES_and_naive_methods.R

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```
# Course: Time series analysis
# Exercise: 6th / Comparison of SES and naive methods
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```

```
require(astsa)
```

```
## Loading required package: astsa
```

```
require(tseries)
```

```
## Loading required package: tseries
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

```
require(Metrics)
```

```
## Loading required package: Metrics
```

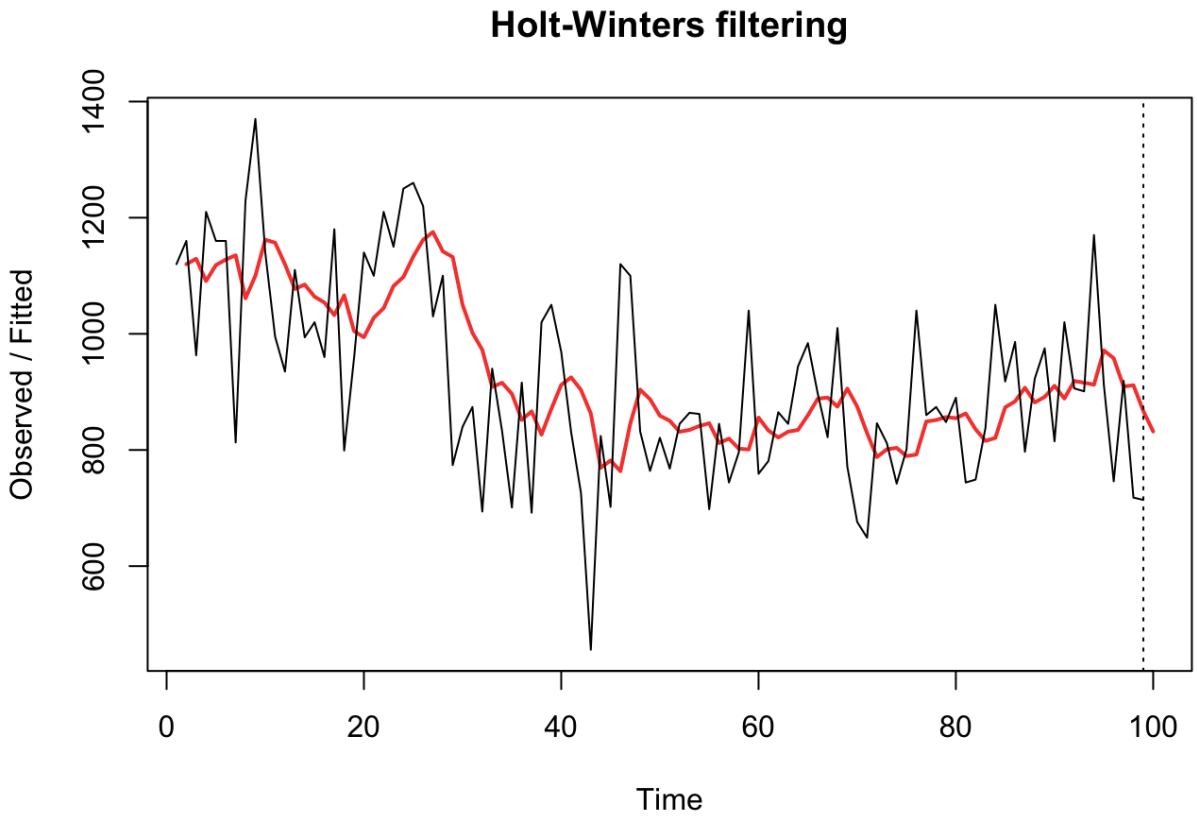
```
# 1.)

# 2.)
# AVG fc
nile_v <- c(Nile)
nile_avg <- sum(nile_v)/length(nile_v)

# NAIVE fc
nile_naive <- nile_v[length(nile_v)-1]

# SES fc
Nile_exp = HoltWinters(Nile[1:99], beta = FALSE, gamma = FALSE)
nile_pred <- predict(object = Nile_exp, n.ahead = 1, prediction.interval = FALSE)
nile_ses <- c(nile_pred)

plot(Nile_exp, nile_pred, lwd = 2)
```




```
nile_actual <- Nile[100]

# MSE
print(mse(nile_actual, nile_naive))
```

```
## [1] 676
```

```
print(mse(nile_actual, nile_ses))
```

```
## [1] 8443.644
```

```
print(mse(nile_actual, nile_avg))
```

```
## [1] 32166.42
```

```
# MAE
print(mae(nile_actual, nile_naive))
```

```
## [1] 26
```

```
print(mae(nile_actual, nile_ses))
```

```
## [1] 91.8893
```

```
print(mae(nile_actual, nile_avg))
```

```
## [1] 179.35
```

```
# MAPE
print(mape(nile_actual, nile_naive)) # 3,5%
```

```
## [1] 0.03513514
```

```
print(mape(nile_actual, nile_ses)) #12,4%
```

```
## [1] 0.1241747
```

```
print(mape(nile_actual, nile_avg)) # 24%
```

```
## [1] 0.2423649
```

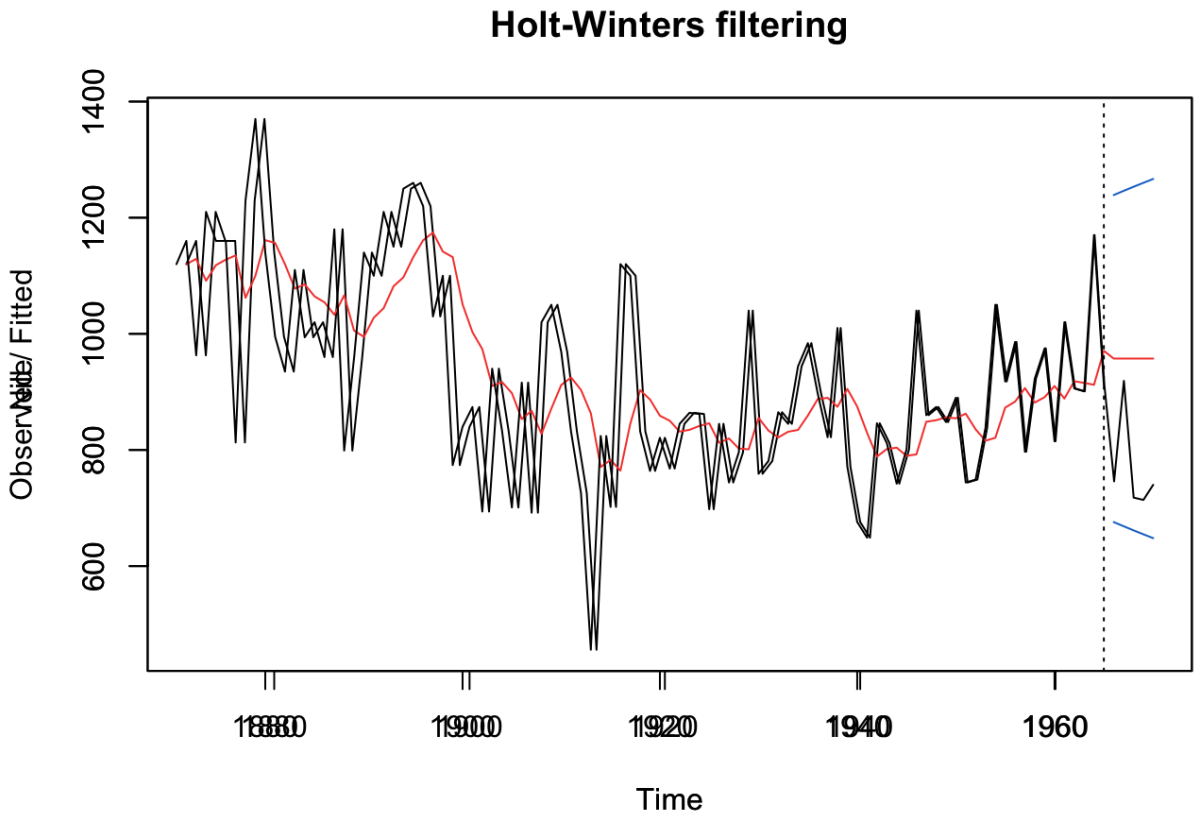
```
# 3.)
training_sample <- window(x = Nile, start = 1871, end = 1965)
test_sample <- window(x = Nile, start = 1966, end = 1970)

forecase_model <- HoltWinters(training_sample, beta = FALSE, gamma = FALSE)
forecase_model$alpha
```

```
## [1] 0.2270709
```

```
forecast <- predict(object = forecase_model, n.ahead = 5, prediction.interval = TRUE)

plot(Nile)
par(new=TRUE)
plot(forecase_model, forecast)
```




```
# err
forecast_ses <- c(forecast)[1:5]
mse(test_sample, forecast_ses)
```

```
## [1] 42009.81
```

```
mae(test_sample, forecast_ses)
```

```
## [1] 190.0347
```

```
mape(test_sample, forecast_ses)
```

```
## [1] 0.2586993
```