oefeningen hoofdstuk 8 - tijdsreeksen

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12 april 2019

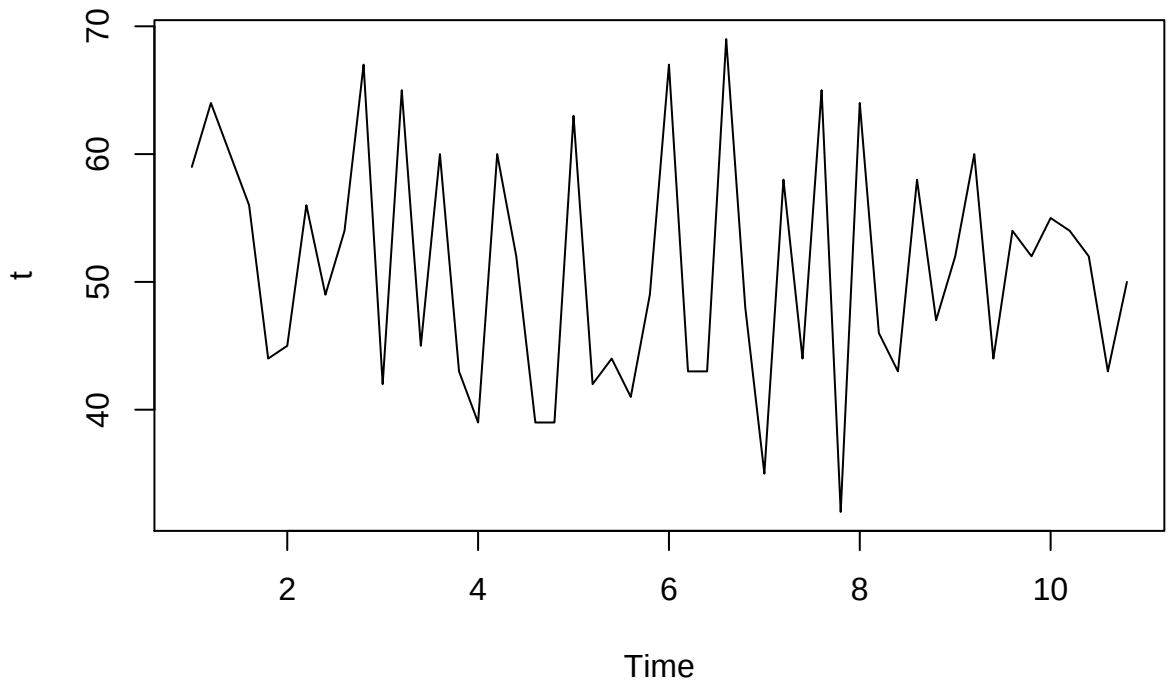
```
x <- round(rnorm(50, 50, 10))
x
```

```
##  [1] 59 64 60 56 44 45 56 49 54 67 42 65 45 60 43 39 60 52 39 39 63 42 44
## [24] 41 49 67 43 43 69 48 35 58 44 65 32 64 46 43 58 47 52 60 44 54 52 55
## [47] 54 52 43 50
```

```
t <- ts(x, frequency = 5)
t
```

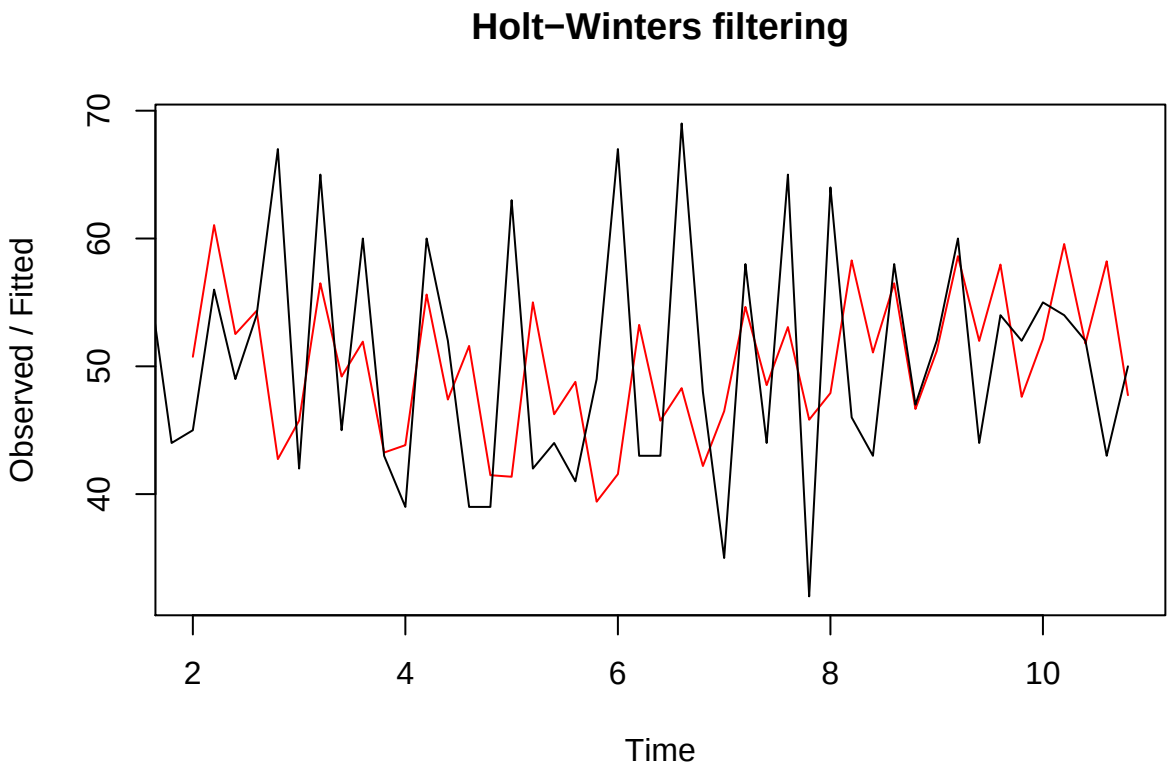
```
## Time Series:
## Start = c(1, 1)
## End = c(10, 5)
## Frequency = 5
##  [1] 59 64 60 56 44 45 56 49 54 67 42 65 45 60 43 39 60 52 39 39 63 42 44
## [24] 41 49 67 43 43 69 48 35 58 44 65 32 64 46 43 58 47 52 60 44 54 52 55
## [47] 54 52 43 50
```

```
plot(t)
```



```
fit <- HoltWinters(t)

plot(fit)
```



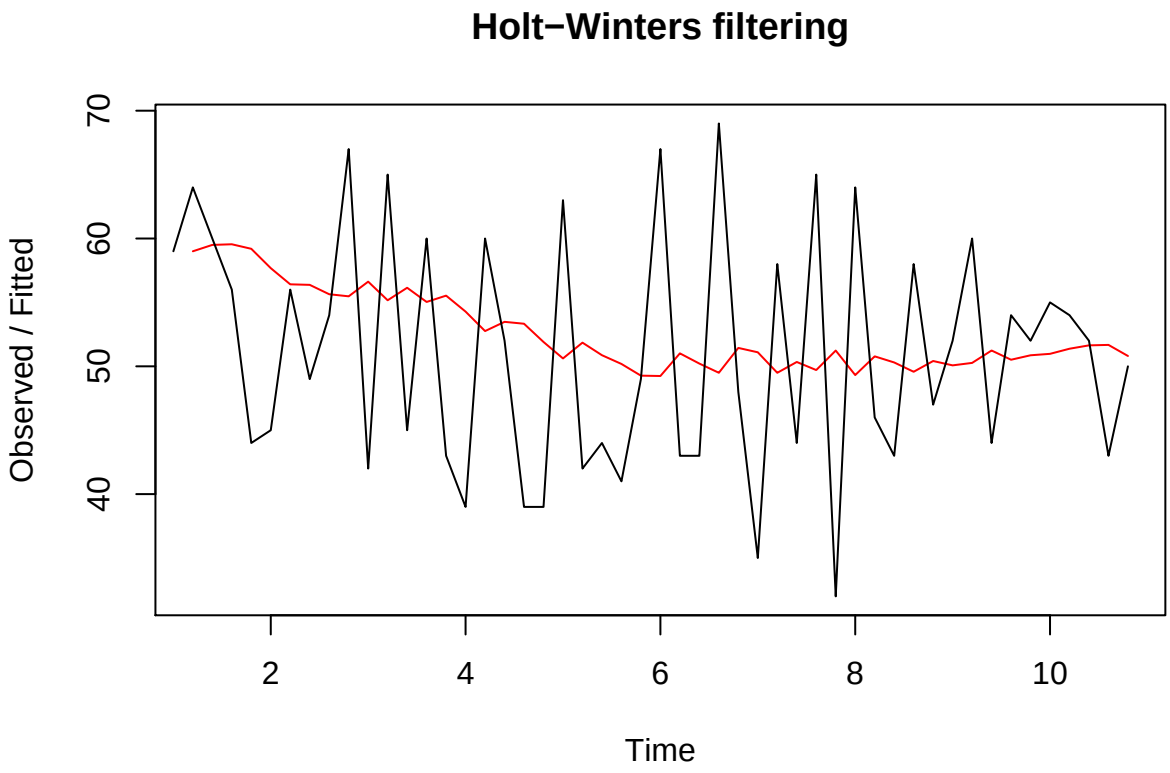

```
fit
```

```
## Holt-Winters exponential smoothing with trend and additive seasonal component.
##
## Call:
## HoltWinters(x = t)
##
## Smoothing parameters:
##  alpha: 0.02899247
##  beta : 1
##  gamma: 0.07221497
##
## Coefficients:
##          [,1]
## a  52.9554384
## b  -0.2902095
## s1 -1.0225046
## s2  5.4994057
## s3 -1.7984661
## s4  3.4622409
## s5 -4.9906185
```

merk op dat alpha heel klein is

```
fit <- HoltWinters(t,beta = FALSE, gamma =FALSE)

plot(fit)
```




```
fit
```

```
## Holt-Winters exponential smoothing without trend and without seasonal component.
##
## Call:
## HoltWinters(x = t, beta = FALSE, gamma = FALSE)
##
## Smoothing parameters:
##  alpha: 0.09970296
##  beta : FALSE
##  gamma: FALSE
##
## Coefficients:
##       [,1]
## a 50.72904
```

merk op dat alpha groter is

voorpselling maken

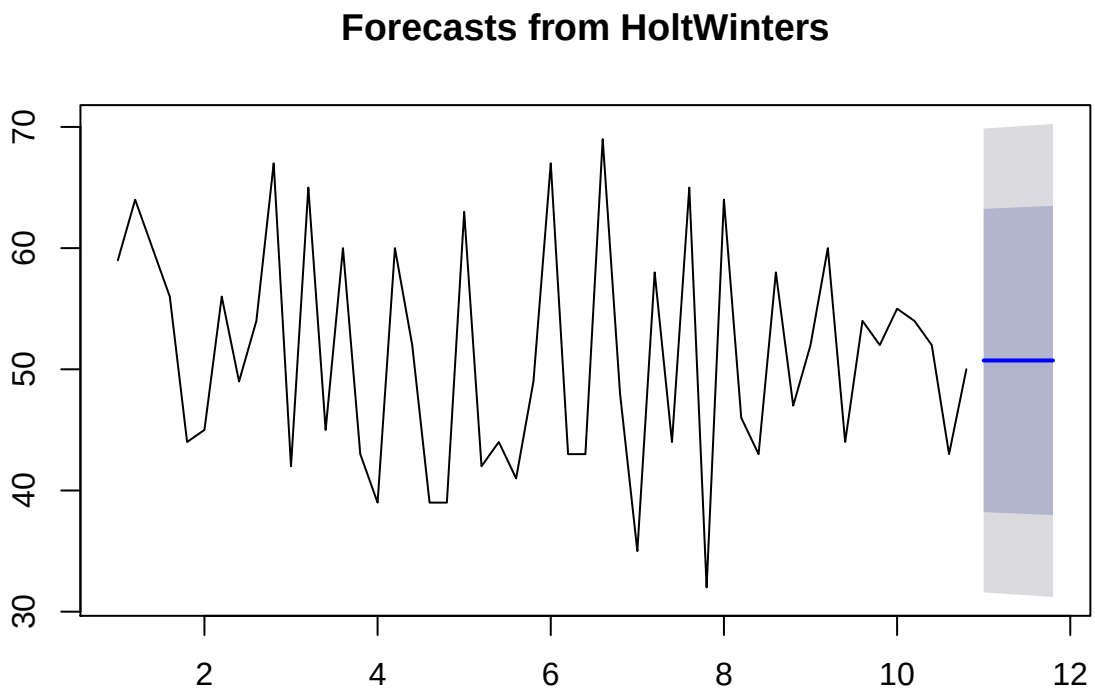
```
library(forecast)
```

```
## Warning: package 'forecast' was built under R version 3.5.3
```

```
f <- forecast(fit, 5)
f
```

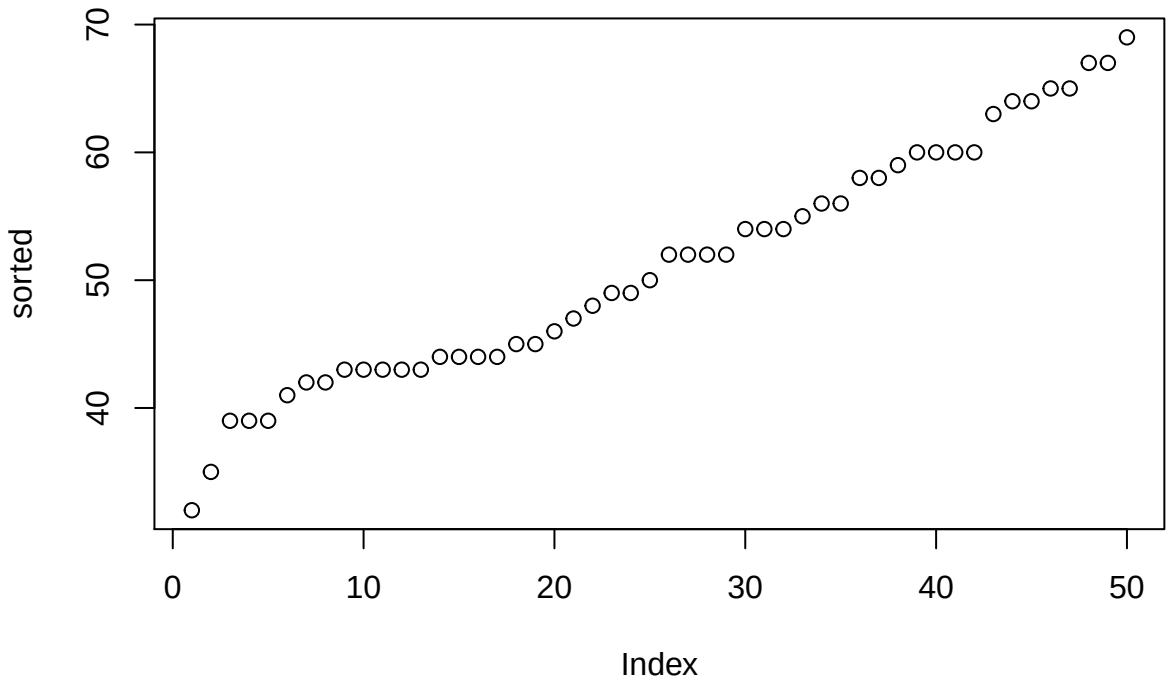
```
##       Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
## 11.00       50.72904 38.21776 63.24031 31.59470 69.86337
## 11.20       50.72904 38.15573 63.30234 31.49983 69.95824
## 11.40       50.72904 38.09401 63.36407 31.40543 70.05265
## 11.60       50.72904 38.03258 63.42549 31.31148 70.14659
## 11.80       50.72904 37.97145 63.48662 31.21799 70.24008
```

```
plot(f)
```



voorbeelde met stijgende data

```
sorted <- sort(x)
plot(sorted)
```



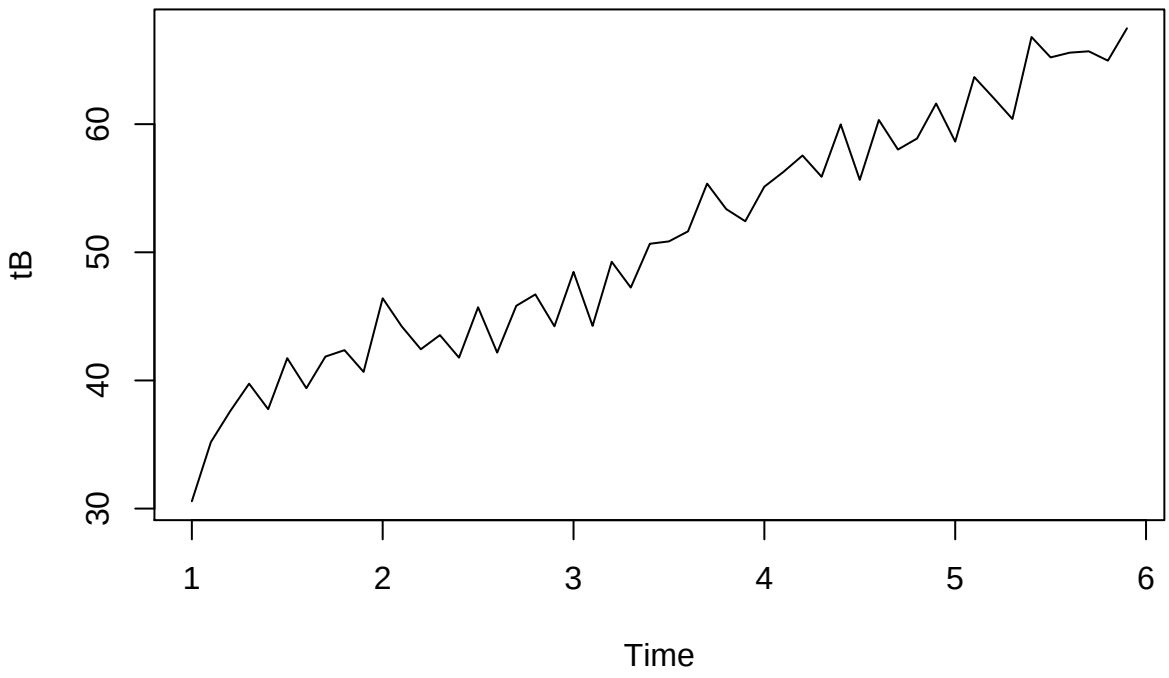

```
# dataset laten veriëren
```

dataset laten veriëren:

```
eta <- rnorm(50,0,2)
betaTS <- sorted + eta
```

tijdsreeks maken

```
tB <- ts(betaTS, frequency = 10)
plot(tB)
```

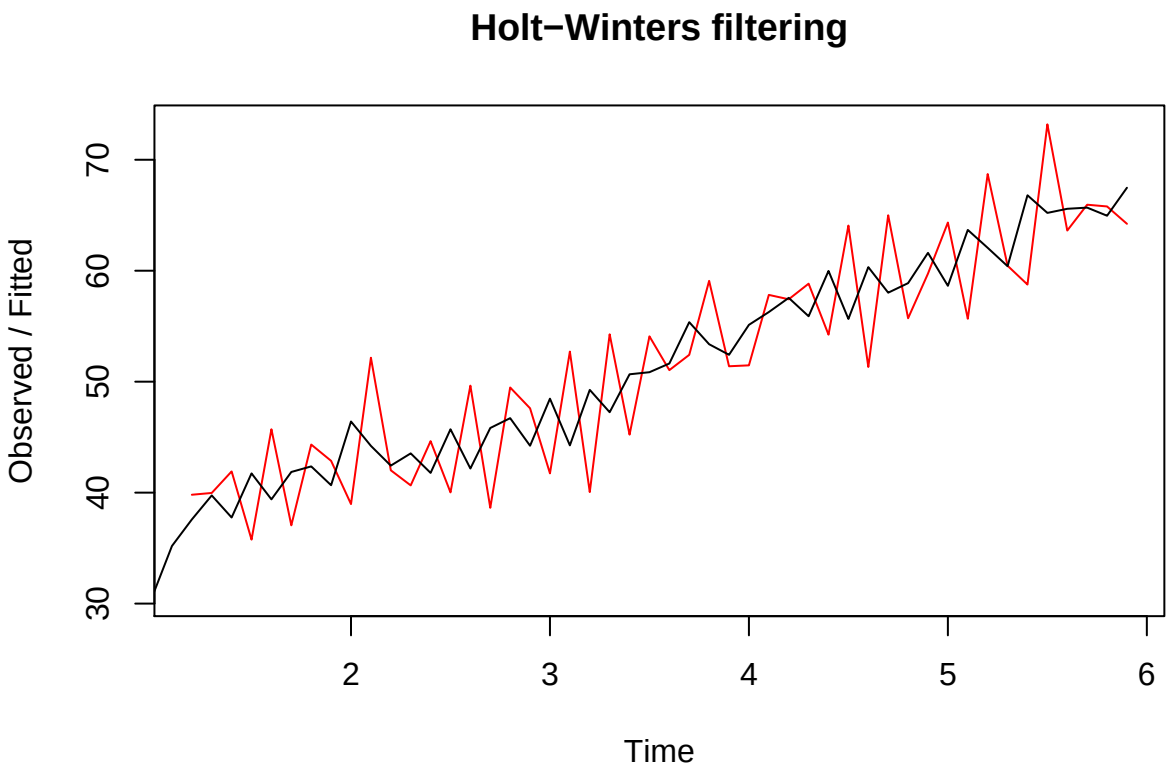


de grafiek stijgt, dus we moeten beta gerbuiken

```
fitB <- HoltWinters(tB, alpha = TRUE, beta = TRUE, gamma=FALSE)
fitB
```

```
## Holt-Winters exponential smoothing with trend and without seasonal component.
##
## Call:
## HoltWinters(x = tB, alpha = TRUE, beta = TRUE, gamma = FALSE)
##
## Smoothing parameters:
##  alpha: TRUE
##  beta : TRUE
##  gamma: FALSE
##
## Coefficients:
##        [,1]
## a 67.476248
## b  2.520926
```

```
plot(fitB)
```


Holt−Winters filtering
Observed / Fitted
30
40
50
60
70
2
3
4
5
6
Time