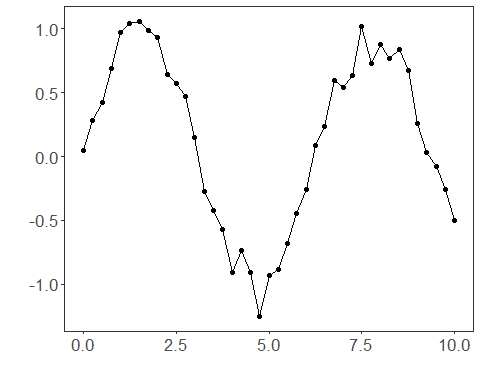
Objective: Smooth the series using a state-space model with a Kalman Filter, controlling observation noise (H) and process noise (Q).

# Filter - Kalman  
  
# Installing the package (if needed)  
#install.packages("tspredit")

# Loading the packages  
library(daltoolbox)  
library(tspredit)

# Series for study with artificial noise and spikes  
  
data(tsd)  
y <- tsd$y  
noise <- rnorm(length(y), 0, sd(y)/10)  
spike <- rnorm(1, 0, sd(y))  
tsd$y <- tsd$y + noise  
tsd$y[10] <- tsd$y[10] + spike  
tsd$y[20] <- tsd$y[20] + spike  
tsd$y[30] <- tsd$y[30] + spike

library(ggplot2)  
# Noisy series visualization  
plot\_ts(x=tsd$x, y=tsd$y) + theme(text = element\_text(size=16))



# Applying the Kalman filter  
  
filter <- ts\_fil\_kalman(H = 0.1, Q = 1)  
filter <- fit(filter, tsd$y)  
y <- transform(filter, tsd$y)  
plot\_ts\_pred(y=tsd$y, yadj=y) + theme(text = element\_text(size=16))

