

STL ts frequency = 1

Question Link

I am using the `stats::stl` function for first time in order to identify and delete the technological signal of a crop yields serie. I am not familiar with this method and I am a newbie on programming, in advance I apologize for any mistaken.

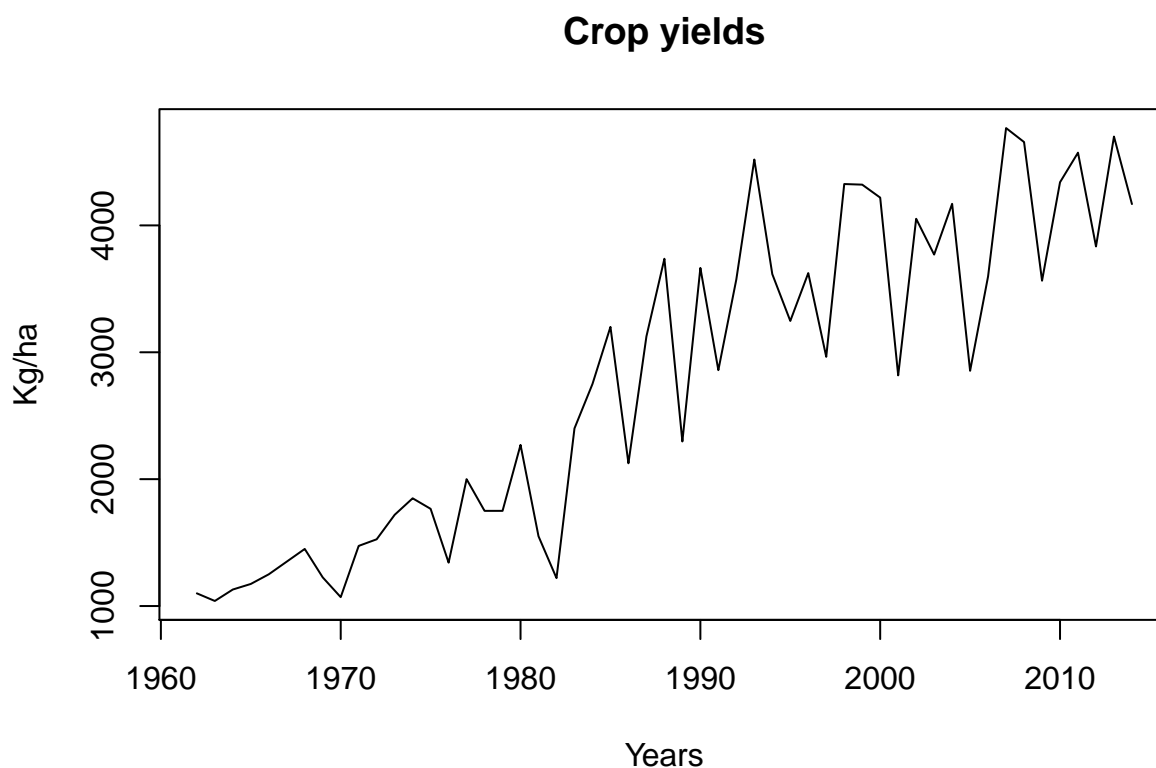
These are the original data I am working with:

```
dat <- data.frame(year = seq(1962, 2014, 1), yields = c(1100, 1040, 1130, 1174,
  1250, 1350, 1450, 1226, 1070, 1474, 1526, 1719, 1849, 1766, 1342, 2000,
  1750, 1750, 2270, 1550, 1220, 2400, 2750, 3200, 2125, 3125, 3737, 2297,
  3665, 2859, 3574, 4519, 3616, 3247, 3624, 2964, 4326, 4321, 4219, 2818,
  4052, 3770, 4170, 2854, 3598, 4767, 4657, 3564, 4340, 4573, 3834, 4700,
  4168))
```

This is the ts with frequency =1 (annual) created as input for STL function:

```
time.series <- ts(data=dat$yields, frequency = 1, start=c(1962, 1), end=c(2014, 1))

plot(time.series, xlab="Years", ylab="Kg/ha", main="Crop yields")
```

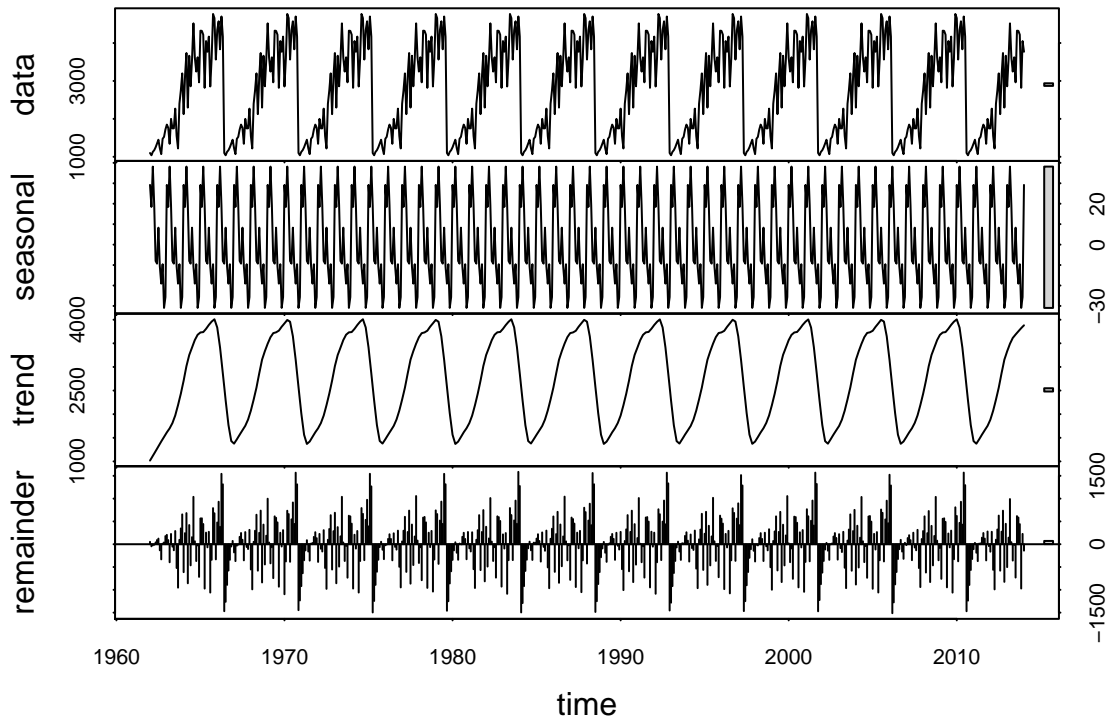


When I try to run the function I get the following error message:

```
decomposed <- stl(time.series, s.window='periodic')
> Error in stl(time.series, s.window = "periodic") : series is not periodic or has less than two periods
```

I know that my serie is annual and therefore I can not vary the frequency in the ts which it is seems what causes the error because when I change the frequency I get the seasonal, trend and remainder signals:

```
time.series <- ts(data = dat$yields, frequency = 12, start = c(1962, 1), end = c(2014, 1))
decomposed <- stl(time.series, s.window = "periodic")
plot(decomposed)
```



I would like to know if there is a method to apply STL function with annual data with a frequency of observation per unit of time = 1. On the other hand, to remove the technological signal, it is only necessary to obviate the trend and remainder signal from the original serie or I am mistaken?

Many thanks for your help.

Answer

Since you are using annual data, there is no seasonal component, therefore seasonal decomposition of time series would not be appropriate. However, the `stats::stl` function calls the `loess` function to estimate trend, which is a local polynomial regression you can adjust to your liking. You can call `loess` directly and estimate your own trend as follows.

```
dat <- data.frame(year = seq(1962, 2014, 1), yields = c(1100, 1040, 1130, 1174,
  1250, 1350, 1450, 1226, 1070, 1474, 1526, 1719, 1849, 1766, 1342, 2000,
  1750, 1750, 2270, 1550, 1220, 2400, 2750, 3200, 2125, 3125, 3737, 2297,
  3665, 2859, 3574, 4519, 3616, 3247, 3624, 2964, 4326, 4321, 4219, 2818,
  4052, 3770, 4170, 2854, 3598, 4767, 4657, 3564, 4340, 4573, 3834, 4700,
  4168))

dat$trend <- loess(yields ~ year, data = dat)$fitted

plot(y = dat$yields, x = dat$year, type = "l", xlab = "Years", ylab = "Kg/ha",
  main = "Crop yields")
lines(y = dat$trend, x = dat$year, col = "blue", type = "l")
```

