

## > Time Series Practice 3 - Feb. 12th

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## > Load & View the Data

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```
# "precip1.dat" contains total annual rainfall in inches for London from 1813 to 1912  
  
# 'scan' is the same as read.csv, read.table, read.excel, etc., but it is used for UNIVARIATE data  
  
# Since here we're dealing with Exp. Smoothing, there is no 'sides' argument  
  
# 'skip = 1' is used when the data set includes a header  
  
df = scan("precip1.dat", skip = 1)
```

```
head(df)
```

```
↔ 23.56 · 26.07 · 21.86 · 31.24 · 23.65 · 23.88
```

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## > Convert the Data to Time Series

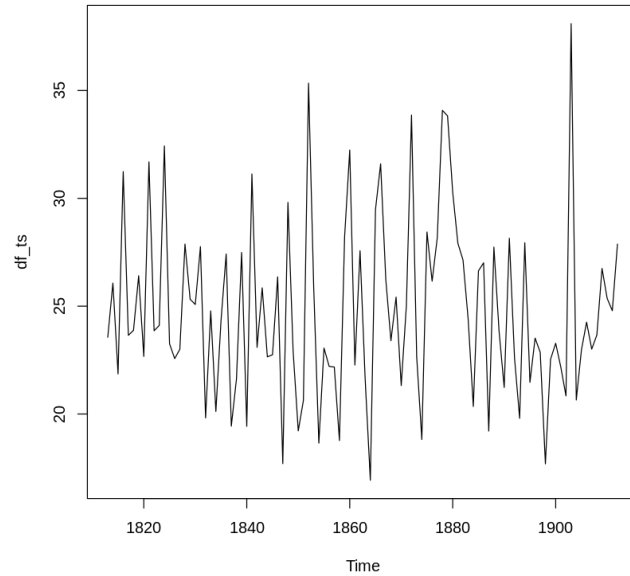
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```
# 'ts' stands for time series  
  
df_ts = ts(df, start = c(1813))
```

## > Plot the Time Series Data

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```
plot(df_ts)
```



## › Simple Exponential Smoothing + Plot

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```
# If a time series can be described using an additive model (constant fluctuations over time) like the one above,  
# then Simple Exponential Smoothing is used to make short-term forecasts
```

```
df_ts_forecasts = HoltWinters(df_ts, beta = FALSE, gamma = FALSE)
```

```
df_ts_forecasts
```

⇒ Holt-Winters exponential smoothing without trend and without seasonal component.

Call:

```
HoltWinters(x = df_ts, beta = FALSE, gamma = FALSE)
```

Smoothing parameters:

alpha: 0.02412151

beta : FALSE

gamma: FALSE

Coefficients:

[,1]

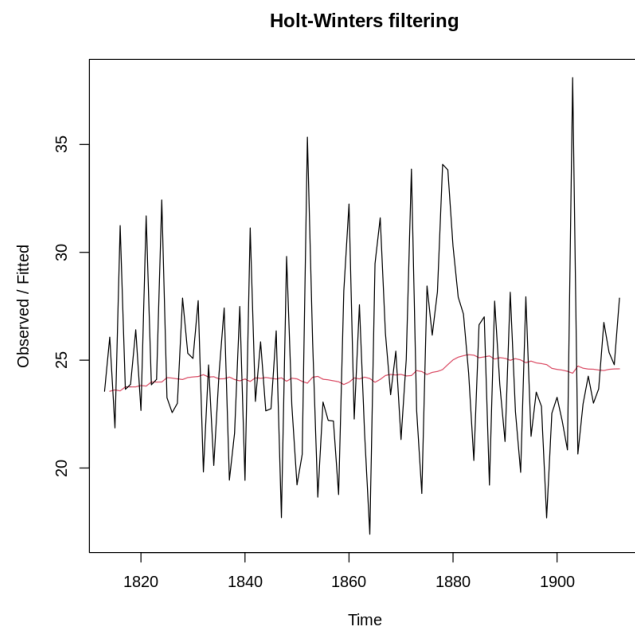
a 24.67819

# What does 24.67819 from the above represent?

# It's the estimated level (or smoothed value) at the end of the smoothing process; The estimate of the avg. level of rainfall  
# at the most recent time point in the series

# Simply put, it's the estimate of the latest rainfall value based on all of the previous data

```
plot(df_ts_forecasts)
```



## > Decomposition

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```
# The basic command is 'decompose'

# For an Additive Model: x = decompose(name of series, type = "additive")

# For a Multiplicative Model: x = decompose(name of series, type = "multiplicative")
```