

Assignment 1: Moving Average

Submission: Submit photos of the answers to Canvas. For Question 3, submit the plot of the R-code to Canvas.

Question 1. Calculation

Given the following time series y_t .

t	y_t
1	1
2	3
3	5
4	8
5	12
6	13
7	16

- Calculate the moving average series with $k = 2$
- Calculate the moving average series with $k = 3$
- Calculate the double moving average series with $k = 3$

Question 2. Application of MA: Forecasting Linear Trend Time Series

We assume the series in question 1 has linear trend. Use double smoothing average to estimate the linear trend (slope) of the time series. Use the estimated linear trend to predict the next value (y_8)

Question 3. Application of MA: Trend Revealing by Visualization

In this question, we will use R to plot a time series, create an MA series and plot the MA series.

- Download and Install R at: [link](#)
- Download and Install Rstudio at: [link](#)
- Open Rstudio and use the following code to plot a time series and a moving average series.

```
install.packages('TTR') # install TTR package

library(TTR)
# read data
d <- read.csv('https://bryantstats.github.io/math475/data/MedCPISmooth.csv')
t1 = ts(d$PerMEDCPI, start = 1947, frequency = 4)

# plot the time series
plot(t1, main = paste0("Medical Component of the CPI"))

# create a moving average series
k = 16 # set the moving average
t1_sma = SMA(t1, n = k)

# plot the moving average series
lines(t1_sma, col = "red")
```