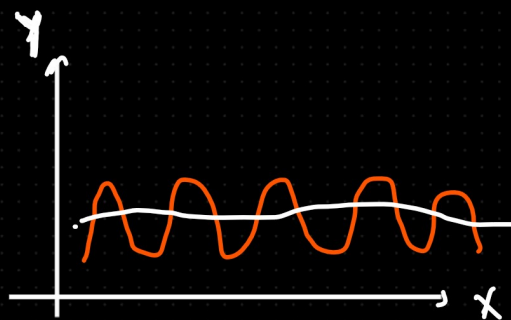
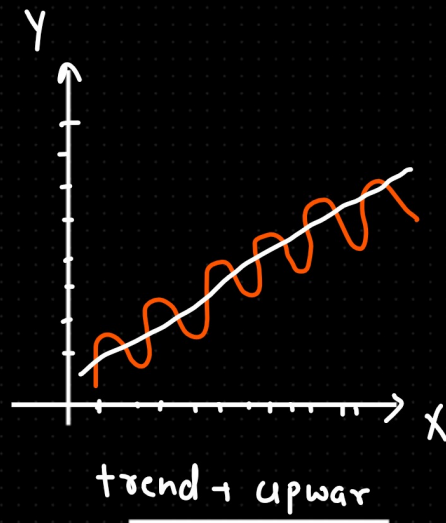


Stationary - Non-stationary time Series

Time Series data

D_1	15
D_2	16
D_3	17
D_4	14
D_5	18



Moving avg

→ time axis \Rightarrow Window
→ average

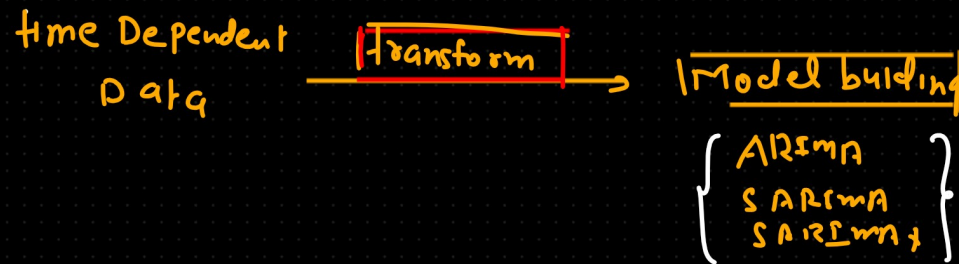
→ my moving avg is not-constant

→ Var is not constant in my time series

if my mean and variance is not-constant over the time then my time series is called non-stationary

if my mean and variance is constant over the time then my time series is called stationary

Machine learning



- ① Data
- ② EDA
- ③ Preprocess
- ④ model
- ⑤ model evaluation

$\left[\text{transform} \rightarrow \text{Nonstationary} \rightarrow \text{stationary Data} \right]$

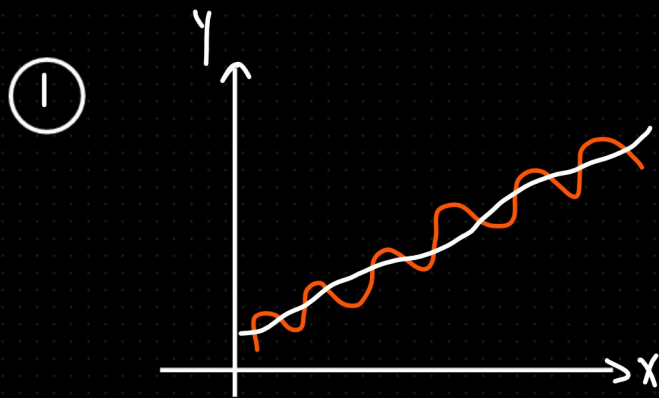
① first identify my data is stationary or not

② if my data is not stationary then i have to make it stationary.

① IDENTIFY the data

① visualization

② status based test

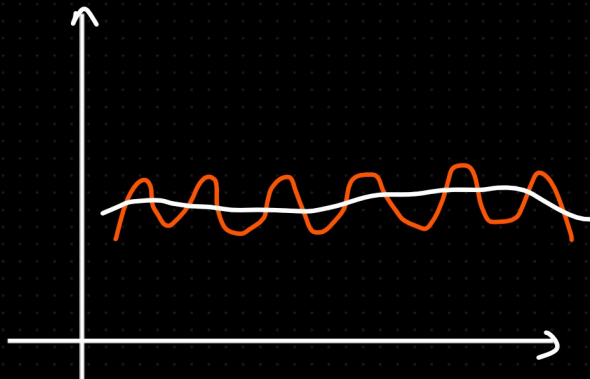


⇒ trend ⇒ upward

= moving average = growing
(not constant)

my time series is not stationary

(not stationary ⇒ mean, var ^{is not} constant)



(stationary ⇒ constant mean, var)

② Stats based test

ADF \Rightarrow augmented dickey-fuller test

- ① test statistics
- ② p-value \Rightarrow
- ③ critical-value
- ④ lag-length

$$\boxed{p \leq 0.05}$$

\rightarrow Please Reject the Null hypothesis

$$\boxed{p > 0.05}$$

\rightarrow Please accept the Null hypothesis

$H_0 \Rightarrow$ null hypothesis

\rightarrow my data is not stationary

$H_1 \Rightarrow$ alternative hypothesis

\rightarrow my data is stationary

② Now convert Non-stationary data to the stationary data

ARIMA
↓
(Differencing)

- ① Differencing
- ② log
- ③ root
- ④ Seasonal adjustment

Differencing of the data

