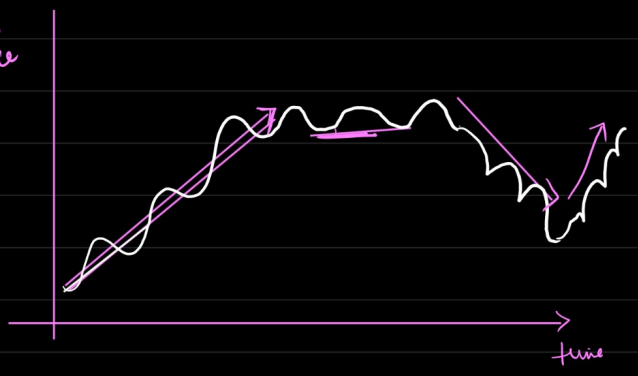
Components of Time series

Analysis ↔ forecasting — time series → Airline passenger.

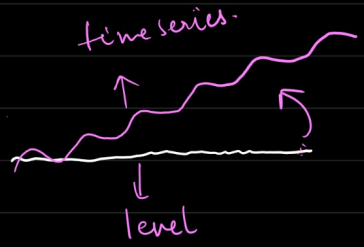
Time series Analysis

1. level
2. trend
3. season / seasonality
4. cycle / cyclicity
5. Noise

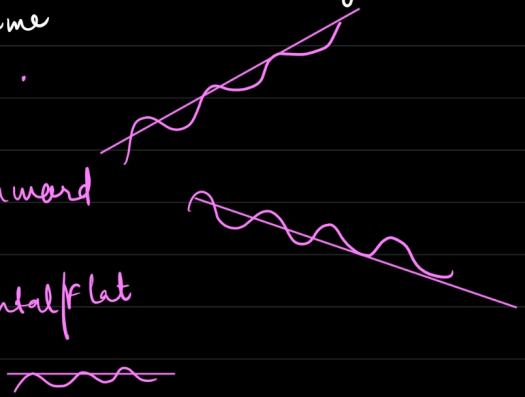


① **level** → the base value of a time series on which other components are added.

② **trend** — Long term movement or direction in data over a long period of time

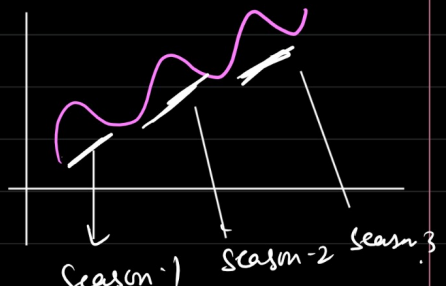


1. Upward.
2. Downward
3. Horizontal/flat



③ **season** :- Frequent repetation in a data over regular interval such as daily, monthly, annualy

Example → Sales of ice-cream increases in summer
→ Sales of electronic gadgets in diwali.
→ traffic in peak hours
→ No of tourist visiting every year.

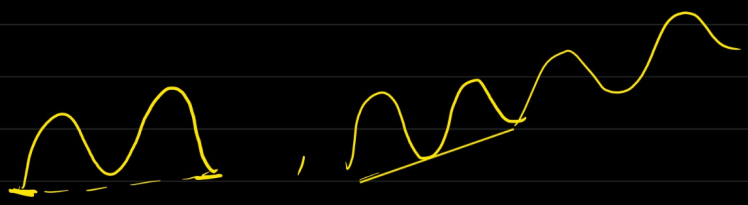


④ **Cycle / cyclicity** → The fluctuation in the data over a longer period of time. These periods are not fixed and can vary.

Cycle → Noise (Anomalous behaviours, Unexpected behaviour)

Cyclicity – Season + Noise over a long period of time.

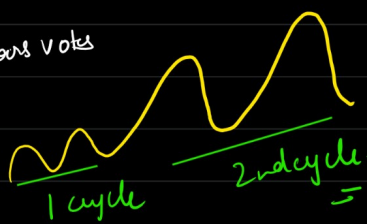
∴ Noise/Anomaly



ex. Stock price

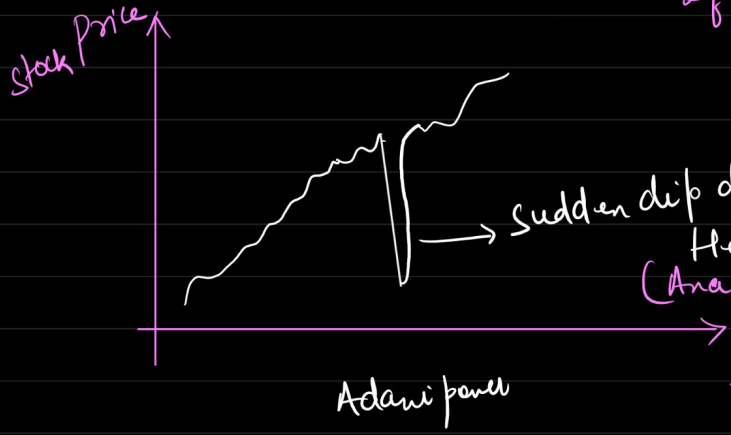
ex. Politics – every 5 years votes

ex. Economics – GDP.



⑤ Noise

↳ Anomaly / Outlier → Some uncertainty / randomness in time series data because of unexpected reason.



reasons

→ News
→ Reports
→ Pandemic
→ wars
→ elections.
→ Influencer

* Dogecoin always use to move unexpectedly after Elon Musk's tweet.

Time series

Analysis

Forecasting

* Based on components of a time series, there are two types of time series.

time series

Additive

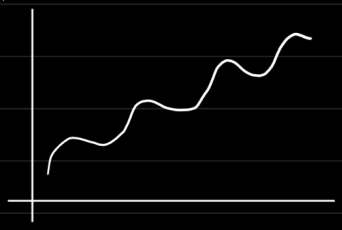
→ y_t = Trend + Seasm + Noise

→ Linear over time

→ Constant variance

→ Increased trend at same difference

Day 1	100	→ diff
Day 2	200	
Day 3	300	
Day 4	400	



Multiplicative

→ y_t = Trend × Seasm × Noise

→ Non-linear

→ Non-constant variance.