Moving Average (MA)

Types of Moving Averages

📊

Simple MA

Equal weights for recent observations

⚖️

Weighted MA

Different weights by recency

📉

Exponential Smoothing

Exponentially decreasing weights

✓ **Benefits**

- Smoothing noisy data
- Trend identification
- No look-ahead bias for forecasting

⚠ **Limitations**

- Cannot capture complex patterns
- Cannot model seasonality

Trend Calculation Example

Time Period	t=1	t=2	t=3	t=4	t=5
Observed Value (Y_t)	10	12	15	14	18

📐 **3-Period Simple Moving Average**

t=3: $MA_3 = (10 + 12 + 15) / 3 =$ **12.33**

t=4: $MA_3 = (12 + 15 + 14) / 3 =$ **13.67**

t=5: $MA_3 = (15 + 14 + 18) / 3 =$ **15.67**

☑ Trend: 12.33 → 13.67 → 15.67 (Upward trend)

🔮 Forecasting with Moving Average

Method: Use the most recent MA value as the forecast for the next period

Forecast for t=6: $\hat{Y}_6 = MA_3$ at t=5 = **15.67**

Alternative (if $Y_6 = 20$): MA_3 at t=6 = (14 + 18 + 20) / 3 = **17.33**

Then forecast for t=7: $\hat{Y}_7 =$ **17.33**

💡 The MA forecast assumes the trend continues at the current smoothed level