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Time Series Forecasting

1.6 Robust Baselines for Forecasting

Mario Tormo Romero

Design IT.
Create Knowledge.

What we'll cover in this video

- Introduction to Baselines
- Overview of the Practice Datasets
- Naive and Seasonal Naive Forecasts
- Averaging Methods: Mean, SMA, and EMA
- Model Comparison: AIC & BIC

What are Forecasting Baselines

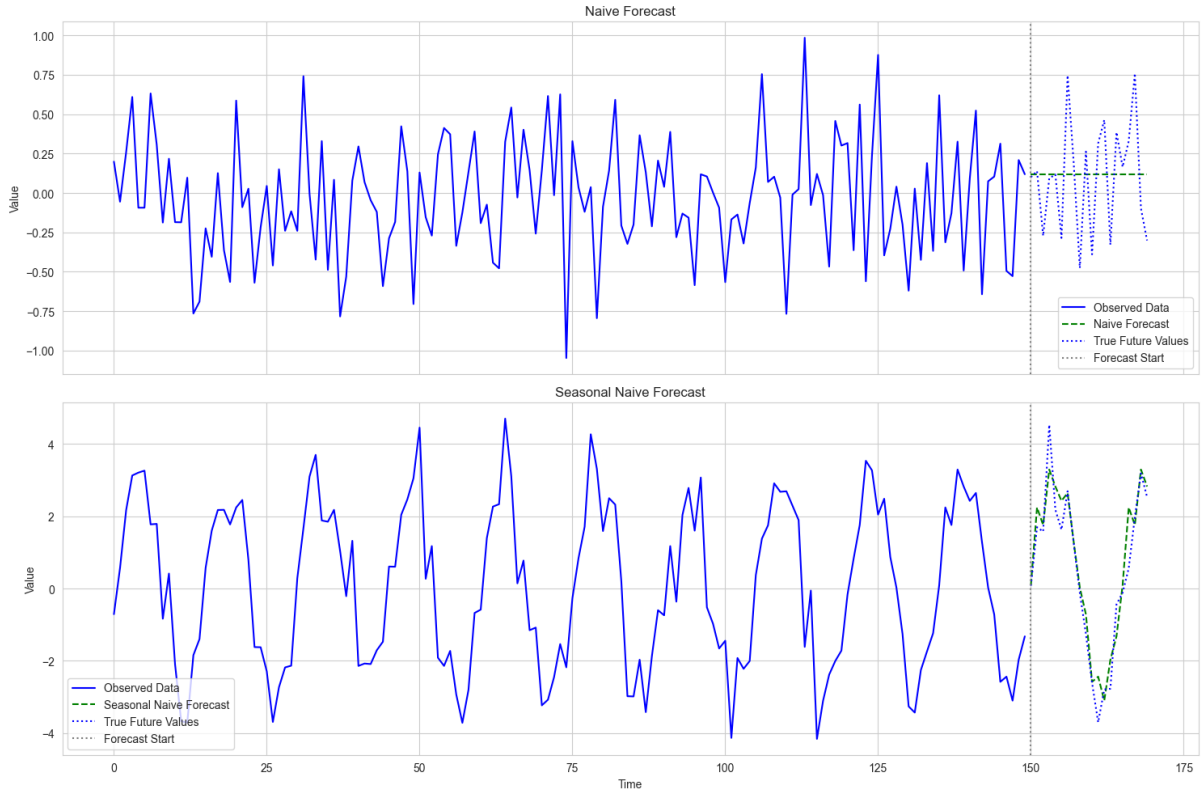
- Baselines are simple models that serve as a reference point.
- They help answer the question “Is my complex model actually doing better than a basic one?”
- Why Use Baselines?
  - Quick to compute
  - Easy to interpret
  - Often surprisingly competitive
  - Help identify if a model is overfitting or unnecessary

Simple Baselines

Naive & Seasonal Naive Forecasts

- **Naive Forecast**
  - Predicts the next value as the most recent observed one.
  - Best suited for stable data without strong trends or seasonal patterns.
  - Simple, but surprisingly effective as a baseline.

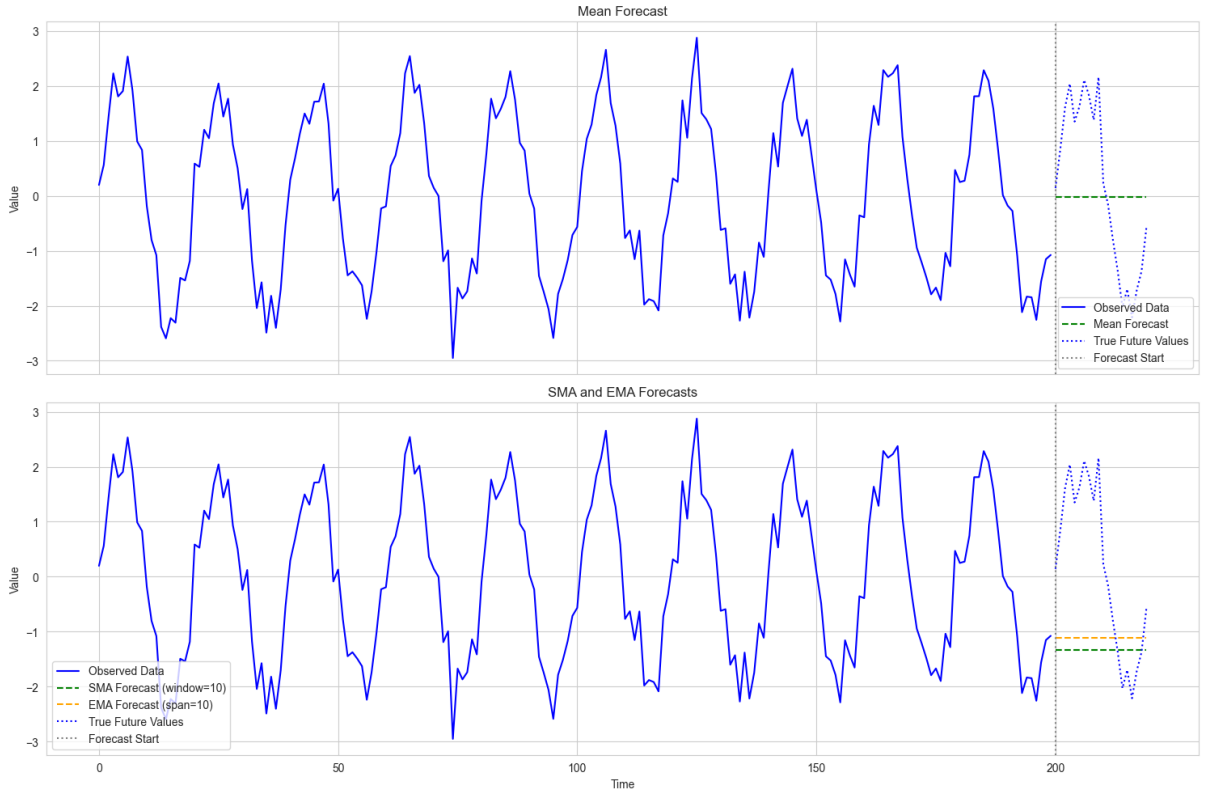
- **Seasonal Naive Forecast**
  - Assumes the future value will repeat the last observed value from the same season.
  - Example: Tomorrow’s temperature equals the temperature on the same day last year.
  - Ideal for data with strong seasonality (e.g., sales, weather, electricity demand).



Simple Baselines

Averaging Methods

- **Mean Forecast**
  - Uses the overall average of all past observations.
  - Assumes the future will resemble the historical average.
  - Best for stable series with no trend or seasonality.
- **Rolling Averages**
  - Averages recent values over a moving window.
  - Two main types:
    - Simple Moving Average (**SMA**): Unweighted mean of the last n points.
    - Exponential Moving Average (**EMA**): More weight on recent observations.
  - Helps smooth short-term fluctuations and highlight trends.



Model Comparison

AIC & BIC

- Compare models beyond just forecast accuracy, favoring simpler models that explain the data well.

- **AIC – Akaike Information Criterion**
  - Balances model fit and complexity.
  - Penalizes models with too many parameters.

- **BIC – Bayesian Information Criterion**
  - Similar to AIC but penalizes complexity more heavily.
  - More conservative; favors simpler models more strongly.

- A lower value is better for both AIC and BIC

What we‘ve learnt

- Why Baselines Matter
  - Baselines set the minimum bar your model should beat.
  - Help you detect when a "fancy" model isn’t actually doing better.

- How to Choose?
  - No trend or seasonality? → Try Naive or Mean forecast
  - Strong seasonality? → Go for Seasonal Naive or Rolling Average
  - Recent trends are important? → Consider EMA

- Model Comparison with AIC & BIC
  - Classic tools to compare models based on fit and complexity