Forecasting Models with R

Section 2: Simple Forecasting Methods

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Simple Forecasting Methods Overview

- **Simple forecasting methods** are used as initial benchmarks for comparison purposes against other complex ones.

Arithmetic Mean

- **Arithmetic mean** consists of forecasted values equal to simple average of historical data.

$$\widehat{y}_t = \mu = \frac{1}{n} * \sum_{t=1}^{n} y_t$$

Naïve or Random Walk Method

- **Naïve or random walk method** consists of forecasted values equal to previous period historical data.

$$\hat{y}_t = y_{t-1}$$

Seasonal Random Walk Method

- **Seasonal random walk method** consists of forecasted values equal to previous season historical data.

$$\hat{y}_t = y_{t-m}$$

Random Walk with Drift Method

- **Random walk with drift method** consists of forecasted values equal to previous period's data plus the arithmetic mean of historical data period differences.

$$\hat{y}_t = y_{t-1} + \mu \Delta y_t$$

$$\Delta y_t = y_t - y_{t-1}$$

Forecasting Accuracy

- **Forecasting accuracy** is evaluated on which one minimizes the residuals or forecasting errors based on scale-dependent and scale-independent measures.
- **Scale-dependent:**
  - **Mean absolute error (MAE)**

$$MAE = \frac{1}{n} * \sum_{t=1}^{n} |\varepsilon_t|$$

  - **Root Mean squared error (RMSE)**

$$RMSE = \sqrt{\frac{1}{n} * \sum_{t=1}^{n} {\varepsilon_t}^2}$$

Forecasting Accuracy

- **Scale-independent:**
  - **Mean absolute percentage error (MAPE)**

$$MAPE = \sum_{t=1}^{n} \frac{|\varepsilon_t|}{y_t} * 100$$