

Mean Absolute Error (MAE): The average of all absolute errors for each forecast interval. Measures the average accuracy of forecasts without considering error direction.

$$\frac{1}{n} \sum_{i=1}^n (f_i - m_i)$$

Mean Absolute Percent Error (MAPE): This is the same as MAE except it is normalized by the capacity of the facility.

Root Mean Square Error (RMSE): Measures the average accuracy of forecasts without considering error direction and gives a relatively high weight to large errors

$$\sqrt{\frac{1}{n} \sum_{i=1}^n (f_i - m_i)^2}$$

Root Mean Square Percent Error (RMSPE): As above normalize by plant capacity.

BIAS: Indicates whether the model is systematically under- or over-forecasting

$$\frac{1}{n} \sum_{i=1}^n (f_i - m_i)$$

Correlation: Correlation is a statistical technique that is used to measure and describe the STRENGTH and DIRECTION of the relationship between two variables.

$$r(x, y) = \frac{COV(x, y)}{STD_x \cdot STD_y} = \frac{\sum (x - \bar{x}) \cdot (y - \bar{y})}{N \cdot STD_x \cdot STD_y}$$

where f are the forecasted values, m are the measurements, COV is the covariance, STD is the standard deviation.

Standard Deviation: A measure of the spread or dispersion of a set of data. The more widely the values are spread out, the larger the standard deviation. It is calculated by taking the square root of the variance.

$$STD = \sqrt{\left(\frac{\sum ((f_i - \bar{f})^2)}{n} \right)}$$

Variance: A measure of the average distance between each data point and the data mean value; equal to the sum of the squares of the difference between each point value and the data mean.

$$\sigma^2 = \frac{\sum ((f_i - \bar{f})^2)}{n}$$