Help on Univariate Linear method

The linear method imputes missing values by drawing a straight line between non-Nas observations, as follows.

Let Y_{it} be the missing data in a trajectory where i refers to a series in the dataset (i^{th} column) and t reflect the date (time). Additionally, Y_{ia} and Y_{ib} are the closest preceding and following non-missing values, respectively $(a \geq t \geq b)$. For example, the following trajectory contains three NAs and two non-NAs from both sides including Y_{ia} and Y_{ib}:

$$Y_{it-3}, Y_{ia}, NA, NA, NA, Y_{ib}, Y_{it+3}$$

The imputation takes into consideration the distance between the imputed observation, Y_{it}^* and a and b, as follows:

$$Y_{it}^* = w \cdot Y_{ia} + (1 - w) \cdot Y_{ib}$$

Where w is the proportional distance of t to b and (1-w) is the proportional distance of t to a:

$$w = \frac{b - t}{b - a} \quad ; \quad (1 - w) = \frac{t - a}{b - a}$$

The linear imputed observation can be presented also as:

$$Y_{it}^* = Y_{ia} + \frac{t - a}{b - a}(Y_{ib} - Y_{ia})$$

Screen example is depicted below. In all imputation figures, the non-NA observations are the colored lines while the imputed values (Y_{it}^*) are the colored dots.

Univariate Linear Imputation

Legend: — Industrial — Industrial_imp — Elect.Water — Elect.Water_imp — Services — Services_imp