The Recursive Future And Past Equation Based On The Ananda Damayanthi Normalized Similarity Measure

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Abstract
In this research investigation, the author has presented a Recursive Future Equation based on the Ananda-Damayanthi Normalized Similarity Measure [1].

Theory
The Recursive Future Equation
Given a Time Series $Y = \{y_1, y_2, y_3, \ldots, y_{n-1}, y_n\}$

we can find $y_{n+1}$ using the following Recursive Equation.

$$y_{n+1} = \sum_{k=1}^{n} \frac{\text{Smaller of } (y_{n+1}, y_k)}{\text{Larger of } (y_{n+1}, y_k)} \ y_k$$

where $T = \left\{ \sum_{k=1}^{n} \frac{\text{Smaller of } (y_{n+1}, y_k)}{\text{Larger of } (y_{n+1}, y_k)} \right\}^2$

From the above Recursive equation, we can solve for $y_{n+1}$

The Recursive Past Equation
Given a Time Series $Y = \{y_1, y_2, y_3, \ldots, y_{n-1}, y_n\}$

we can find $y_0$ using the following Recursive Equation.

$$y_0 = \sum_{k=0}^{n-1} \frac{\text{Smaller of } (y_n, y_k)}{\text{Larger of } (y_n, y_k)} \ y_k$$
where \( T = \left\{ \sum_{k=0}^{n-1} \left\{ \begin{array}{l} \text{Smaller of } (y_n, y_k) \\ \text{Larger of } (y_n, y_k) \end{array} \right\}^2 \right\} \)

From the above Recursive equation, we can solve for \( y_0 \)

References