The Recursive Past And Future Equation Based On The Ananda-Damayanthi Similarity Measure And Its Series Considered To Exhaustion

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Abstract

In this research investigation, the author has presented a Recursive Past Equation and a Recursive Future Equation based on the Ananda-Damayanthi Similarity Measure and its series considered to Exhaustion [1].

The Recursive Past Equation

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

we can find y_0 using the following Recursive Past Equation

$$y_n = \underset{p\to\infty}{Limit}\left\{\sum_{k=0}^{n-1} y_k \left\{\frac{\left\{\frac{S_k}{L_k}\right\} + \left\{\frac{S_{k+1}}{L_{k+1}}\right\} + \left\{\frac{S_{k+2}}{L_{k+2}}\right\} + \ldots\ldots + \left\{\frac{S_{k+p-1}}{L_{k+p-1}}\right\} + \left\{\frac{S_{k+p}}{L_{k+p}}\right\}}{\sqrt{\left\{\frac{S_k}{L_k}\right\}^2 + \left\{\frac{S_{k+1}}{L_{k+1}}\right\}^2 + \left\{\frac{S_{k+2}}{L_{k+2}}\right\}^2 + \ldots\ldots + \left\{\frac{S_{k+p-1}}{L_{k+p-1}}\right\}^2 + \left\{\frac{S_{k+p}}{L_{k+p}}\right\}^2}}\right\}\right\}$$

where

$S_k = Smaller\ of\ (y_n, y_k)$ and $L_k = L\arg er\ of\ (y_n, y_k)$

$S_{k+1} = Smaller\ of\ ((L_k - S_k), y_k)$ and $L_{k+1} = L\arg er\ of\ ((L_k - S_k), y_k)$

$S_{k+2} = Smaller\ of\ ((L_{k+1} - S_{k+1}), y_k)$ and $L_{k+2} = L\arg er\ of\ ((L_{k+1} - S_{k+1}), y_k)$

$S_{k+p-1} = Smaller\ of\ ((L_{k+p-2} - S_{k+p-2}), y_k)$ and $L_{k+p-1} = L\arg er\ of\ ((L_{k+p-2} - S_{k+p-2}), y_k)$

$S_{k+p} = Smaller\ of\ ((L_{k+p-1} - S_{k+p-1}), y_k)$ and $L_{k+p} = L\arg er\ of\ ((L_{k+p-1} - S_{k+p-1}), y_k)$

From the above Recursive Equation, we can solve for y_0.

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 Future Equation

$$y_{n+1} = \underset{p \to \infty}{Limit}\left\{\sum_{k=1}^{n} y_k \left\{ \frac{\left\{\frac{S_k}{L_k}\right\} + \left\{\frac{S_{k+1}}{L_{k+1}}\right\} + \left\{\frac{S_{k+2}}{L_{k+2}}\right\} + \ldots + \left\{\frac{S_{k+p-1}}{L_{k+p-1}}\right\} + \left\{\frac{S_{k+p}}{L_{k+p}}\right\}}{\sqrt{\left\{\frac{S_k}{L_k}\right\}^2 + \left\{\frac{S_{k+1}}{L_{k+1}}\right\}^2 + \left\{\frac{S_{k+2}}{L_{k+2}}\right\}^2 + \ldots + \left\{\frac{S_{k+p-1}}{L_{k+p-1}}\right\}^2 + \left\{\frac{S_{k+p}}{L_{k+p}}\right\}^2}} \right\}\right\}$$

where

$S_k = Smaller\ of\ (y_{n+1}, y_k)$ and $L_k = L\arg er\ of\ (y_{n+1}, y_k)$

$S_{k+1} = Smaller\ of\ ((L_k - S_k), y_k)$ and $L_{k+1} = L\arg er\ of\ ((L_k - S_k), y_k)$

$S_{k+2} = Smaller\ of\ ((L_{k+1} - S_{k+1}), y_k)$ and $L_{k+2} = L\arg er\ of\ ((L_{k+1} - S_{k+1}), y_k)$

$S_{k+p-1} = Smaller\ of\ ((L_{k+p-2} - S_{k+p-2}), y_k)$ and $L_{k+p-1} = L\arg er\ of\ ((L_{k+p-2} - S_{k+p-2}), y_k)$

$S_{k+p} = Smaller\ of\ ((L_{k+p-1} - S_{k+p-1}), y_k)$ and $L_{k+p} = L\arg er\ of\ ((L_{k+p-1} - S_{k+p-1}), y_k)$

From the above Recursive Equation, we can solve for y_{n+1}.

References

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