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The Recursive Future And Past Equation Based On The Ananda-Damayanthi Similarity Measure Considered To Exhaustion (New)

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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 considered to Exhaustion [1].

The Recursive Past Equation

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

we can find y_0 using the following Recursive Past Equation

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

where

$S_k = Smaller\ of\ (y_n, y_k)$ and $L_k = Larger\ of\ (y_n, y_k)$

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

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

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

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

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

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The Recursive Future Equation

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

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

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

where

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

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

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

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

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

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

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