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The Recursive Past Equation Based On The Ananda-Damayanthi Similarity Measure

ISSN 1751-3030

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Abstract

In this research investigation, the author has presented a Recursive Past Equation based on the Ananda-Damyanthi Similarity Measure [1].

Theory

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

we can find y_0 using the following Recursive Future Equation

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

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

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

where

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

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

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