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

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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 \(Y = \{y_1, y_2, y_3, \ldots, y_{n-1}, y_n\}\)

we can find \(y_0\) using the following Recursive Future Equation

\[
y_n = \lim_{p \to \infty} \left\{ \sum_{k=0}^{n-1} y_k \left( \left\{ S_k \left\{ \frac{S_{k+1}}{L_k} \right\} + \left\{ \frac{S_{k+2}}{L_{k+1}} \right\} + \ldots + \left\{ \frac{S_{k+p-1}}{L_{k+p-1}} \right\} + \left\{ \frac{S_{k+p}}{L_{k+p}} \right\} \right\} \right\}
\]

where

\(S_k = \text{Smaller of } (y_n, y_k)\) and \(L_k = \text{Larger of } (y_n, y_k)\)

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

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

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

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

From the above Recursive Equation, we can solve for \(y_0\).
References

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Abstract

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

Theory

Given a Time Series \( Y = \{y_1, y_2, y_3, \ldots, y_n \} \)

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

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

where

\[
S_k = \text{Smaller of } (y_{n+1}, y_k) \quad \text{and} \quad L_k = \text{larger of } (y_{n+1}, y_k)
\]

\[
S_{k+1} = \text{Smaller of } ((L_k - S_k), y_k) \quad \text{and} \quad L_{k+1} = \text{larger of } ((L_k - S_k), y_k)
\]

\[
S_{k+2} = \text{Smaller of } ((L_{k+1} - S_{k+1}), y_k) \quad \text{and} \quad L_{k+2} = \text{larger of } ((L_{k+1} - S_{k+1}), y_k)
\]

\[
S_{k+p-1} = \text{Smaller of } ((L_{k+p-2} - S_{k+p-2}), y_k) \quad \text{and} \quad L_{k+p-1} = \text{larger of } ((L_{k+p-2} - S_{k+p-2}), y_k)
\]

\[
S_{k+p} = \text{Smaller of } ((L_{k+p-1} - S_{k+p-1}), y_k) \quad \text{and} \quad L_{k+p} = \text{larger of } ((L_{k+p-1} - S_{k+p-1}), y_k)
\]

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