Riemann Integral Reiteration*

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Abstract

The notes contained herein outline the delta-x of the Riemann sum equation transformation into a function used to find the area spectrum of a data set. The transformation uses an eigenfunction by expanding the data set arrays into eigenvecotrs.

1 Delta-x Transformation through an Eigenfunction

The formatting for the expressions in this module are currently being revised.

Transformation from a Riemann sum equation to the function for area spectrum (A) is the eigenvalue:

$$\lambda = n^2 1^{-1} \tag{1}$$

The area spectrum can be stretched through array duplication across multipule dimensions forming a matrix. The matrices complimenting the eigenvalue have an equal number of values. For this instance of "λ", a matrix formulation is necessary for the Riemann Δx and (A) arrays by duplicating the vertical elements so that the horizontal size of each matrix equals the number of inputs of the original array:

$$\Delta \mathrm{x} = \text{Eigenvectors}\left(\text{Subscript}\left(x, \mathrm{nn}\right)\right) \tag{2}$$

$$\texttt{[U+F528]} = \Big[\left[\text{Subscript}\left(x, 11\right), \text{Subscript}\left(x, 12\right), \cdots, \text{Subscript}\left(x, 1n\right)\right], \left[\text{Subscript}\left(x, 21\right)\right.\right. \tag{3}$$

$$A = \text{Eigenvectors}\left(\text{Subscript}\left(\frac{\partial^0 x}{}, \mathrm{nn}\right)\right) \tag{4}$$

$$\texttt{[U+F528]} = \left[\left[\text{Subscript}\left(\frac{\partial^0 x}{}, 11\right), \text{Subscript}\left(\frac{\partial^0 x}{}, 12\right), \cdots, \text{Subscript}\left(\frac{\partial^0 x}{}, 1n\right)\right], \left[\text{Subscript}\left(\frac{\partial^0 x}{}, 21\right), \text{S}\right.\right. \tag{5}$$

The eigenvalue representing a squared value of the n number of observations is congruent to the input in either matrix. Thereby, the eigenfunction for the vectors and data set independent variable is possible.

$$\text{ErrorBox}\left(\text{TextData}\left(\text{"}Ax = \lambda \Delta x\text{"}\right)\right) \tag{6}$$

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When ErrorBox (TextData ("λ")) is applied to the Riemann Δx, find the matrix transformation by the function of x.

$$\text{Set}\left(\text{Ax}, \left(n^2 1^{-1}\right)\left(\left(b-1a\right)n^{-1}\right)\right) \tag{7}$$

$$\text{Set}\left(A, n\left(b-1a\right)x^{-1}\right) \tag{8}$$

The area spectrum is calculated from a data set using the same variables as the Riemann sum equation and solved for A with f(x):

$$\sum_{x=1}^{n} n\left(b-1a\right)x^{-1} \tag{9}$$

The resulting equation (5) represents all possible areas of a data set calculated by the Riemann sum equation.