Bagadi, R. (2017). Scheme For Finding The Next Term Of A Sequence Based On Evolution {File Closing Version 1}. ISSN 1751-3030. *PHILICA.COM Article number 1137*. http://www.philica.com/display_article.php?article_id=1137

Scheme For Finding The Next Term Of A Sequence Based On Evolution {File Closing Version 1}. ISSN 1751-3030

Author:

Ramesh Chandra Bagadi

Data Scientist

INSOFE (International School Of Engineering),

Hyderabad, India.

rameshcbagadi@uwalumni.com

+91 9440032711

Research Manuscript

Abstract

In this research investigation, the author has detailed a novel method of finding the next term of a sequence based on Evolution.

Theory

Given any Sequence of the kind,

$$S = \{y_1, y_2, y_3, \dots\dots, y_{n-1}, y_n\}$$

We first write them as

$$S = \left\{ \begin{matrix} y_1 = {}^N p_{j_1+\delta_1}, y_2 = {}^N p_{j_2+\delta_2}, y_3 = {}^N p_{j_3+\delta_3}, \dots\dots, y_{n-1} = {}^N p_{j_{n-1}+\delta_{n-1}}, \\ y_n = {}^N p_{j_n+\delta_n} \end{matrix} \right\}$$

where in ${}^N p_{j_1+\delta_1}$, N is the Order Number of the Higher Order Sequence Of Primes in which the number y_1 is slated, $(j_1 + \delta_1)$ is the position number of the Prime Metric Basis Element. Here, j_i 's are Positive Integers and $0 < \delta_i < 1$.

For Example,

7 which is the 4th Prime Metric Basis Element of the Standard Primes, the Order [1] of which can be taken to 1. Therefore 7 can be written as ${}^1 p_4$. In a

similar fashion, 8 can be written as ${}^{1}p_{4+\left(\frac{8-7}{11-7}\right)}$ where 7 is the nearest previous prime number of 8 and 11 is the next nearest prime number of 8. Here, in the notation ${}^{1}p_{4+\left(\frac{8-7}{11-7}\right)}$, we can consider $\left(\frac{8-7}{11-7}\right)$ as the δ, the 4 as the j and the 1 as the N. We can also denote any number in a similar fashion using Higher Order Primes as well. [1] i.e., $N>1$.

For Simplicity, we can take $N=1$.

For our representational simplicity, we label our $S=\{y_1, y_2, y_3, \ldots\ldots, y_{n-1}, y_n\}$ as

$S=\{{}_1y_1, {}_1y_2, {}_1y_3, \ldots\ldots, {}_1y_{n-1}, {}_1y_n\}$ where the left south subscript 1 indicates that these numbers are at the level 1 (Base) of the triangle we are going to build.

We now compute the Evolution Orders

$E^{(j+1)y_i}\left({}_jy_i\right) = {}_jy_{(i+1)}$ where $(j+1)y_i$ is the Evolution Order. This means that ${}_jy_i$ needs to be evolved $(j+1)y_i$ times to get ${}_jy_{(i+1)}$. Please see [2] for Evolution method. We repeat this process till we get $E^{(n)y_i}\left({}_{(n-1)}y_i\right) = {}_{(n-1)}y_{(i+1)}$. We now evolve ${}_{(n-1)}y_{(i+1)}$ by one step using [2] and get $E^1\left({}_{(n-1)}y_{(i+1)}\right)$. Note that $E^{\left\{E^1\left({}_{(n-1)}y_{(i+1)}\right)\right\}}\left({}_{(n-2)}y_i\right) = {}_{(n-2)}y_{(i+1)}$.

We repeat this procedure, downwards, repeatedly to find $E^{\{(2)y_n\}}\left({}_{(1)}y_n\right) = {}_{(1)}y_{(n+1)}$.

We illustrate this with an Example of three terms.

Considering

$S = \{y_1, y_2, y_3\}$ which we write as

$S = \{{}_1y_1, {}_1y_2, {}_1y_3\}$ for future representational simplicity.

$E^{{}_2y_1}({}_1y_1) = {}_1y_2$, $E^{{}_2y_2}({}_1y_2) = {}_1y_3$. Now, we write

$E^{{}_3y_1}({}_2y_1) = {}_2y_2$. We now evolve ${}_3y_1$ by one step using [2], i.e., perform $E^1({}_3y_1)$. And now, we write $E^{\{E^1({}_3y_1)\}}({}_2y_2) = {}_2y_3$. Finally, we write, $E^{({}_2y_3)}({}_1y_3) = {}_1y_4 = y_4$ which is the next term of the sequence $S = \{y_1, y_2, y_3\}$. This method can be used advantageously for forecasting.

References

1. Bagadi, R. (2016). Field(s) Of Sequence(s) Of Primes Of Positive Integral Higher Order Space(s). *PHILICA.COM Article number 622*. http://philica.com/display_article.php?article_id=622
2. Bagadi, R. (2017). One Step Evolution Of Any Positive Real Number. ISSN 1751-3030. *PHILICA.COM Article number 1106*. http://philica.com/display_article.php?article_id=1106
3. http://www.philica.com/advancedsearch.php?author=12897
4. http://www.vixra.org/author/ramesh_chandra_bagadi