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The Ananda-Damayanthi-Radha-Rohith Rishi Sequence Trends of Any Set of Positive Real Numbers

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***Abstract*- In this research investigation, the author has detailed the Theory of Holistic Decomposition of Any Set of Prime Number, Natural Numbers, Positive Real Numbers as One or More Sets Each with Some Periodicity of the Number's Non Integral Prime Basis Position Number.**

Index Terms- Functional Analysis.

INTRODUCTION

The aforementioned Sets which form the Prime Like Trends are of much importance in Functional Analysis as it allows us to decompose data into Trends with unique Natural Periodicity.

THEORY (AUTHOR'S MODEL OF THEORY OF HOLISTIC DECOMPOSITION OF ANY SET OF ANY NATURAL NUMBERS AS ONE OR MORE SETS EACH WITH SOME PERIODICTY OF THE NUMBER'S NON INTEGRAL PRIME BASIS POSITION NUMBER)

METHOD 1

Say any Set S, is given all of whose elements belong to the Set of Natural Numbers. Let the Cardinality of the Set be n. Furthermore, these numbers are arranged in an ascending order.

We now write down each of its elements as sum of primes as detailed below:

Representation of Any Natural Number as a Special Sum of Primes

Note: Here, we consider the following analysis for two cases, namely,

a) 1 is the First Prime and

b) 2 is the First Prime. In the second case if the following representation finally gives delta equal to 1, we have two ways to go further

(i) We can write it as (3-2) or

(ii) Write the sum using primes greater than or equal to 2 only. If it is not possible, we follow scheme a)

Note that since this theoretical research, the experimenter can choose the best option among these which gives the best results.

Firstly, we define Any Number's Non Integral Prime Basis Position Number

Any Number's Non Integral Prime Basis Position Number

Considering any number say f, we can write its nearest primes on either side as p_k and p_{k+1}, where p_k is the k^{th} Prime and p_{k+1} is the $(k+1)^{th}$ Prime. We can then write $f = p_{N+\alpha}$ where $N = k$ and $\alpha = \left(\frac{f - p_k}{p_{k+1} - p_k}\right)\left(\frac{p_{(f-p_k)}}{p_{(p_{k+1}-p_k)}}\right)$ where the notation is explicit.

We can note that any natural number 'q' can always be written as

$q = p_{\max 1} + \delta_1$ Where $p_{\max 1}$ is the greatest Prime Number possible and which is less than q and

$\delta_1 = p_{\max 2} + \delta_2$ Where $p_{\max 2}$ is the greatest Prime Number possible and which is less than δ_1 and

$\delta_2 = p_{\max 3} + \delta_3$ Where $p_{\max 3}$ is the greatest Prime Number possible and which is less than δ_2 and

So on so forth until $\delta_h = 0$ for some positive integer h

Furthermore, from the given Set S, we write many more sets, namely ${}_1S$ as First order Elements Set (of the Sum Expression of the Elements of the Set S as detailed already, which is the set of first terms of the aforementioned sum expression of each element of S), ${}_2S$ Second Order Elements Set (of the Sum Expression of the Elements of the Set S as detailed already, which is the set of second terms of the aforementioned sum expression of each element of S), ${}_3S$ Third Order elements Set (of the Sum Expression of the Elements of the Set S as detailed already, which is the set of third terms of the aforementioned sum expression of each element of S), etc., to exhaustion till ${}_{h}S$,(the h^{th} Order elements Set (of the Sum Expression of the Elements of the Set S as detailed already, which is the set of third terms of the aforementioned sum expression of each element of S). This notion of Order will be implicitly understood in *Example 2*.

Now, if we represent the elements of the First Order Element Set ${}_{1}S$, by ${}_{1}p_{j}$ then ${}_{1}S(1)={}_{1}p_{j\min}$ and ${}_{1}S({}_{1}n)={}_{1}p_{j\max}$. Here, the index *j* represents the Prime Basis Position Number of the Prime p . For example, if 1 is considered as the first prime, then the Prime Basis Position Number of the Prime 2 is 2, of the Prime 3 is 3, of the Prime 5 is 4, of the Prime 7 is 5 and so on so forth.

We now create Subsets of First Order Element Set ${}_{1}S$ in a fashion such that

$${}_{1}S_{r}=\{{}_{1}p_{j\min+r_{1}l_{1}}\}$$

with $r_{1}=0,1,2,....,g$ and $l_{1}=0,1,2,....,\frac{({}_{1}n-1)}{g_{1}}$ and $g_{1}\leq\left(\frac{{}_{1}n-1}{2}\right)$ for ${}_{1}n$ odd

and

$${}_{1}S_{r}=\{{}_{1}p_{j\min+r_{1}l_{1}}\}$$

with $r_{1}=0,1,2,....,g$ and $l_{1}=0,1,2,....,\frac{({}_{1}n)}{g_{1}}$ and $g_{1}\leq\left(\frac{{}_{1}n}{2}\right)$ for ${}_{1}n$ even.

A simple way to find these sets is detailed below using a method detailed below:

For the given set ${}_{1}S$, we index the elements with their Prime Position Basis Numbers. Let this Set be ${}_{1}J$. We now do Cartesian cross product of ${}_{1}J$ with ${}_{1}J$, i.e., we find ${}_{1}J\times{}_{1}J$. Now, for these ${}_{1}n^{2}$ number of ordered pairs $(u1,v1)$, we find the absolute value of the difference $\delta_{(u1,v1)}$ between them. We now separately collect all the u, v's for $\delta_{(u1,v1)}=1$, $\delta_{(u1,v1)}=2$, $\delta_{(u1,v1)}=3$,……., $\delta_{(u1,v1)}=\left(\frac{{}_{1}n-1}{2}\right)$ if ${}_{1}n$ is odd or $\delta_{(u1,v1)}=\left(\frac{{}_{1}n}{2}\right)$ if ${}_{1}n$ is even and call them as a set each. The thusly gotten sets are the desired sets.

Once, we get the locations (Prime Metric Basis Positions Numbers Of The Primes of the given Set ${}_{1}S$) of the thusly Decomposed Sets of the given Set ${}_{1}S$, we can now write the Decomposed Sets of Set ${}_{1}S$ in terms of the Primes representing their Prime Basis Position Numbers.

We now conduct similar analysis for all the rest of the Order Element Sets and finally add the individual components to get the desired Trends as detailed in the following example.

Example 1: When the elements of S are all Primes.

$S=\{3,5,7,13,29,31,53,61,67\}$

Then

$J=\{3,4,5,7,11,12,17,19.20\}$

Here, 1 is taken as the first Prime.

We now create a table of difference between u and v of the ordered pairs of J X J as shown

Table 1: *Table of difference between u1 and v1 of the ordered pairs of* ${}_{1}J\times{}_{1}J$

	3	4	5	7	11	12	17	19	20
3	0	1	2	4	8	9	14	16	17
4	1	0	1	3	7	8	13	15	16
5	2	1	0	2	6	7	12	14	15
7	4	3	2	0	4	5	10	12	13
11	8	7	6	4	0	1	6	8	9
12	9	8	7	5	1	0	5	7	8
17	14	13	12	10	6	5	0	2	3
19	16	15	14	12	8	7	2	0	1
20	17	16	15	13	9	8	3	1	0

Needless to mention, the Set with $(u1,v1)$ difference equal to 1 is the Set J itself. We now find all the pairs with $(u1,v1)$ difference = 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17

Table 2: *Table of distilled Non Unique Prime Trends*

2	{3,5,7} {17,19}
3	{4,7} {17,20}
4	{3,7,11}
5	{7,12,17}
6	{5,11,17}
7	{4,11} {5,12,19}
8	{3,11,19} {4,12,20}
9	{3,12} {11,20}

10	{7,17}
11	None
12	{5,17} {7,19}
13	{7,20} {4,17}
14	{3,17} {5,19}
15	{4,19} {5,20}
16	{3,19} {4,20}
17	{3,20}

These Sets
{3,5,7} which is {3,7,13}
{17,19} which is {53,61}
{4,7} which is {5,13}
{17,20} which is {53,67}
{3,7,11} which is {3,13,29}
{7,12,17} which is {13,31,53}
{5,11,17} which is {7,29,53}
{4,11} which is {5,29}
{5,12,19} which is {7,31,61}
{3,11,19} which is {3,29,61}
{4,12,20} which is {5,31,67}
{3,12} which is {3,31}
{11,20} which is {29,67}
{7,17} which is {13,53}
{5,17} which is {7,53}
{7,19} which is {13,61}
{7,20} which is {13,67}
{4,17} which is {5,53}
{3,17} which is {3,53}
{5,19} which is {7,61}
{4,19} which is {5,61}
{5,20} which is {7,67}
{3,19} which is {3, 61}
{4,20} which is {5,67}
{3,20} which is {3,67}
can be called the Sets gotten by *Holistic Decomposition Of The Given Set S Of Primes As One Or More Sets Each With Some Periodicity Of The Prime Number's Basis Position Number*.

This set of Sets can also be called as the *Primality Tree Set* of the given Set S.

Example 2: When the elements of S are not all Primes.

$$S = \{8,27,34\}$$

$$S = \{(7+1+0),(23+3+1),(31+3+0)\}$$

This gives

$$_1J = \{5,10,12\}$$

$$_2J = \{1,3,3\}$$

$$_3J = \{0,1,0\}$$

For facilitating the addition of Component Prime Trends later on, we can use *Left Sub Pre Tag* and *Right Sub Post Tag* to each of the sum Terms (of *J*) so that later on we know which ones to add on to before and after.

That is, for,

$$S = \{(7+1+0),(23+3+1),(31+3+0)\}$$

We write it as

$$S = \{(7_1 +_7 1_0 +_1 0),(23_3 +_{23} 3_1 +_3 1),(31_3 +_{31} 3_0 +_3 0)\}$$

Then $_1S = \{(7_1),(23_3),(31_3)\}$

$$_2S = \{(_7 1_0),(_{23} 3_1),(_{31} 3_0)\}$$

$$_3S = \{(_1 0),(_3 1),(_3 0)\}$$

Doing the Prime Trends Analysis on

$$_1S = \{(7_1),(23_3),(31_3)\}$$

gives

$$\{10,12\} \Rightarrow \{23,31\}$$

$$\{5,10\} \Rightarrow \{7,23\}$$

$$\{5,12\} \Rightarrow \{7,31\}.$$

Similarly,
doing the Prime Trends Analysis on

$$_2S = \{(_7 1_0),(_{23} 3_1),(_{31} 3_0)\}$$

gives

$$\{1,3\} \Rightarrow \{1,3\}$$

$$\{1,3\} \Rightarrow \{1,3\}$$

Similarly,
doing the Prime Trends Analysis on

$$_3S = \{(_1 0),(_3 1),(_3 0)\}$$

gives

$$\{0,1\} \Rightarrow \{0,1\}$$

Now, using the Primes Sum expression carefully for each term of S, we sum the appropriate terms of the Component Prime Trends, to get the Composite Trends.

This gives us,

$$\{27,34\} = \{(23+3+1),(31+3)\}$$

$$\{8,27\} = \{(7+1),(23+3+1)\}$$

$$\{8,34\} = \{(7+1),(31+3)\}$$

Which can be called as the Sets gotten by *Holistic Decomposition of the Given Set of Natural Numbers as One or More Sets Each with Some Periodicity of the Number's Prime Basis Position Number*.

This set of Sets can also be called as the *Primality Tree Set* of the Set S.

METHOD 2

Say any Set S, is given all of whose elements belong to the Set of Natural Numbers. Let the Cardinality of the Set be n. Furthermore, these numbers are arranged in an ascending order.

For each element of the Set, using the method of One Step Evolution detailed in R. C. Bagadi [1], we find out at what Prime Like Basis Position Number each other element belongs to along its successive One Step Eevolution and also successive One Step Devolution. Once, we write those, we check if they are one step periodic, two, step periodic, and so on so forth to exhaustion. We For each element, we collect all the elements of the given Set that form Prime Like sequences that are either one step periodic, two, step periodic, and so on so forth to exhaustion. In this fashion, we do it for all the elements of the Set. From this, we can now clearly see, all the Prime Like Trends that have some periodicity. *By Prime Like Trend, we mean a Sequence whose periodicity is some positive integer multiple of the Non Integral Prime Basis Position Number of its smallest element*. This will be illustrated by an Example.

Examplehttp://ijirt.org/master/publishedpaper/IJIRT147501_PAPER.pdf

Considering the Set

$$S=\begin{Bmatrix}2,5,6,7,11,14,15,17,21,23,26,29,30,31,\\35,39,41,45,70,84,102,110,130,210,482,1155\end{Bmatrix}$$

Using the method of One Step Evolution detailed in R. C. Bagadi [1], we note that

$$PLT1=\{2,5,11,17,23,31\}\ Period=2$$

$$PLT2=\{2,17,17,29,41\}\ Period=3$$

$$PLT3=\{6,14,21,26,35,39\}\ Period=2$$

$$PLT4=\{6,15,26,35,45\}\ Period=3$$

$$PLT5=\{30,70,102,110,130\}\ Period=2$$

$$PLT6=\{30,84,110\}\ Period=3$$

$$PLT7=\{210,482,1155\}\ Period=2$$

Here, by Period, we mean the number of times One Step Evolution has to be applied successively on any element (other than the last element of this Sequence) of this Prime Like Trend Sequence to reach to its next element in the aforementioned Sequence.

When the Elements of S are Positive Reals, we can make close approximation of each Positive Real as a Rational Number and can take the LCM (Lowest Common Multiple) of the Denominators, and now the Numerator term is the Set of the sequence elements numerators (after the sequence S elements are rendered as set of rationals) each correspondingly multiplied by the ratio of the aforementioned LCM to the corresponding respective sequence elements denominator. Now, we find all the Prime Like Trend Sequences for the Numerator Set and we finally divide these elements each by the LCM value to get the Final Prime Like Trends. A seasoned reader of author's works would not find this task formidable at all.

The author gratefully and graciously names such Prime like Trends of Any Set of Positive Reals as The*Ananda – Damayanthi – Radha – Rohith Rishi* Sequence Trends of Any Set of Positive Real Numbers, named after his loving Father, Mother, Wife and Son.

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