One Step Evolution of Any Positive Real Number

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***Abstract*- In this research investigation, the author has detailed the Theory of One Step Evolution of Any Real Positive Number. Such a theory of One Step Evolution Of A Positive Real Number can be successfully used in Forecasting the next term of a given Sequence of numbers.**

***Index Terms*- Mathematical Evolution**

INTRODUCTION

A detailed description of some types of mathematical theories of evolution can be found in [1].

ONE STEP EVOLUTION OF A PRIME NUMBER (OVERVIEW)

By One Step Evolution of p_j, we mean, if p_j is the l^{th} Prime number then we consider the $(l+1)^{th}$ Prime number as the One Step Evolved version of p_j.

ESTABLISHMENT OF THE THEORY OF ONE STEP EVOUTION OF ANY POSITIVE REAL NUMBER

Part 1:

Given a positive integer 's', we write it as $s = p_1 - \delta_1$ where p_1 is the smallest Prime number greater than s and δ_1 is some positive integer. If δ_1 does not happen to be a prime, we then write δ_1 as $\delta_1 = p_2 - \delta_2$ where p_2 is the smallest Prime number greater than δ_1 and δ_2 is some positive integer. Now, again if δ_2 does not happen to be a prime, we then write δ_2 as $\delta_2 = p_3 - \delta_3$ where p_3 is the smallest Prime number greater than δ_2 and δ_3 is some positive integer. We keep following this procedure till the δ_k (for some k) is either Prime or is 1. We can now write s as

$$s = p_1 - \delta_1$$
$$s = p_1 - (p_2 - \delta_2)$$
$$s = p_1 - (p_2 - (p_3 - \delta_3))$$
$$s = p_1 - (p_2 - (p_3 - (.....(p_k - \delta_k)....)))$$

We now consider One Step Evolution of s as

$$E^1\{s\} = E^1\{p_1\} - (E^1\{p_2\} - (E^1\{p_3\} - (.....(E^1\{p_k\} - E^1\{\delta_k\})....)))$$

Where E^1 is the One Step Evolution Operator

Part 2:

Given a positive integer 's', we write it as $s = p_1 + \delta_1$ where p_1 is the largest Prime number smaller than s and δ_1 is some positive integer. If δ_1 does not happen to be a prime, we then write δ_1 as $\delta_1 = p_2 + \delta_2$ where p_2 is the largest Prime number smaller than δ_1 and δ_2 is some positive integer. Now, again if δ_2 does not happen to be a prime, we then write δ_2 as $\delta_2 = p_3 + \delta_3$ where p_3 is the largest Prime number smaller than δ_2 and δ_3 is some positive integer. We keep following this procedure till the δ_k (for some k) is either Prime or is 1. We can now write s as

$$s = p_1 + \delta_1$$
$$s = p_1 + (p_2 + \delta_2)$$
$$s = p_1 + (p_2 + (p_3 + \delta_3))$$
$$s = p_1 + (p_2 + (p_3 + (.....(p_k + \delta_k)....)))$$

We now consider One Step Evolution of s as

$$E^1\{s\}=E^1\{p_1\}+\left(E^1\{p_2\}+\left(E^1\{p_3\}+\left(.....\left(E^1\{p_k\}+E^1\{\delta_k\}\right)....\right)\right)\right)$$

where E^1 is the One Step Evolution Operator.

Also, the One Step Evolution of any positive fractional number say $\frac{p}{q}$ is given by $E^1\left\{\frac{p}{q}\right\}=\frac{E^1\{p\}}{E^1\{q\}}$ where p and q are some positive integers.

Example 1 (Part1),
Considering the number 56
We can write it as

$$56=59-2$$

$$E^1\{56\}=E^1\{59\}-E^1\{2\}$$

$$E^1\{56\}=61-3=58$$

Since 56 lies in between the Primes 53 and 59, and $E^1\{53\}=59$ and $E^1\{59\}=61$

$E^1\{56\}$ must be less than 61.

Example 1 (Part 2),
Considering the number 56
We can write it as

$$56=53+3$$

$$E^1\{56\}=E^1\{53\}+E^1\{3\}$$

$$E^1\{56\}=59+5=64$$

Since 56 lies in between the Primes 53 and 59, and $E^1\{53\}=59$ and $E^1\{59\}=61$

$E^1\{56\}$ must be less than 61. However, in this case it is 64 which is greater than 61. Hence, we prefer Part 1 for finding the One Step Evolution of 56.

Example 2 (Part 1)
Considering the number 72
We can write it as

$$72=73-1$$

$$E^1\{72\}=E^1\{73\}-E^1\{1\}$$

$$E^1\{72\}=79-2=77$$

Since 72 lies in between the Primes 71 and 73, and $E^1\{71\}=73$

And $E^1\{73\}=79$

$E^1\{72\}$ Must be less than 79.

Note: We consider $E^1\{1\}=2$.

Example 2 (Part 2),
Considering the number 72
We can write it as

$$72=71+1$$

$$E^1\{72\}=E^1\{71\}+E^1\{1\}$$

$$E^1\{72\}=73+2=75$$

Since 72 lies in between the Primes 71 and 73, and $E^1\{71\}=73$

and $E^1\{73\}=79$

$E^1\{72\}$ must be less than 79. However, in this case it is 75 which is less than 79. Since 75 is a better solution than 77 (for being less than 77, see *Example* 2 Part 1), we prefer Part 2 for finding the One Step Evolution of 72.

Note: We consider $E^1\{1\}=2$.

CONCLUSIONS

One can note that the afore-detailed theory of One Step Evolution of A Positive Real Number can be successfully used in Forecasting the next term of a given Sequence of numbers.

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REFERENCES

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