

A Novel Representation Of A Natural Number, A Set Of Natural Numbers And One Step Growth Of Any Natural Number Represented By Primality Trees

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Abstract- In this research investigation the author has presented a novel representation of any natural number as a Primality Tree. Also, the author has presented a novel representation of a given set of any natural numbers. Furthermore, finally, the author has presented the novel representation of One step growth of any number and also any set of natural numbers as a Primality Tree.

Index Terms- Representation.

I. INTRODUCTION

Representation of Sets as Trees is presented in detail in [1].

Author's Representation Models

Representation Of Any Natural Number As A Primality Tree

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

$$s = 1 + \left(\sum_{i=0}^{j_1} p_i \right) + \delta_1 \quad \text{where } \delta_1 < p_{j_1+1} \quad \text{and}$$

$$\delta_{k1} = 1 + \left(\sum_{i=0}^{j_2} p_i \right) + \delta_2 \quad \text{where } \delta_2 < p_{j_2+1} \quad \text{and}$$

$$\delta_{k2} = 1 + \left(\sum_{i=0}^{j_3} p_i \right) + \delta_3 \quad \text{where } \delta_3 < p_{j_3+1} \quad \text{and}$$

.....

so on so forth until

$$\delta_{(m-1)} = 1 + \left(\sum_{i=0}^{j_m} p_i \right) + \delta_m \quad \text{where } \delta_{km} = 0$$

for some natural number 'm', and where p_i is the i^{th} Prime Number with the first Prime being 2 and also with $p_0 = 0$.

The Sets

$$s_1 = \{1, \{p_i \text{ for } i = 0 \text{ to } j_1\}\}$$

$$s_2 = \{1, \{p_i \text{ for } i = 0 \text{ to } j_2\}\}$$

$$s_3 = \{1, \{p_i \text{ for } i = 0 \text{ to } j_3\}\}$$

.....

$$s_m = \{1, \{p_i \text{ for } i = 0 \text{ to } j_m\}\}$$

where $j_1, j_2, j_3, \dots, j_{(m-1)}, j_m$ are some natural numbers, not necessarily distinct.

Forming what can be called as the Primality Tree of the natural number 'S'.

Representation Of Any Set Of Natural Numbers As A Primality Tree

The collective Set Of Primality Tree Representation Sets Of each Natural Number of the given Set forms the Primality Tree of the Set Of given Natural Numbers.

One Step Growth Of Any Natural Number Represented By A Primality Tree

The One Step Growth Of the Primality Tree of the given Natural Number is given by the Primality Tree constituting the Sets

$$s_1 = \{1, \{p_i \text{ for } i = 0 \text{ to } (j_1 + 1)\}\}$$

$$s_2 = \{1, \{p_i \text{ for } i = 0 \text{ to } (j_2 + 1)\}\}$$

$$s_3 = \{1, \{p_i \text{ for } i = 0 \text{ to } (j_3 + 1)\}\}$$

.....

$$s_m = \{1, \{p_i \text{ for } i = 0 \text{ to } (j_m + 1)\}\}$$

One Step Growth Of A Set Of Any Natural Numbers Represented By A Primality Tree

The collective Set Of Primality Tree Representation Sets Of One Step Growth Of each Natural Number of the given Set forms the Primality Tree of the One Step Growth Of the Set Of given Natural Numbers.

REFERENCES

- [1] Sets As Trees
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