Prime density formula

1.Introduction

i^2=-1

$i^{2^{n+1}}$=1   n∈N*

this paper "1" is Prime density

So Design function as

$\frac{1-i^{2^{|n-a|+1}}}{2}$ a∈C   "| |" Absolute value

Or

$$\frac{1-(-1)^{2^{|n-a|}}}{2}$$

p(n)= $n\left(1-\frac{1-i^{2^{|\prod_{k=1}^{n}(\prod_{m=1}^{n}(n-(k+1)(m+1)))|+1}}}{2}\right)$

$$s(n)=\frac{\sum_{1}^{n}\left(1-\frac{1-i^{2^{\left|\prod_{k=1}^{n}\left(\prod_{m=1}^{n}(n-(k+1)(m+1))\right)\right|+1}}}{2}\right)}{n}$$

Prime density formula s(n)

$$t(n)=\frac{1-i^{2^{|(n-a_1)|+1}}}{2}$$

$$\frac{1-i^{2^{|(n-a_1)|+1}}}{2}+\frac{1-i^{2^{|(n-a_2)|+1}}}{2}=\frac{1-i^{2^{|(n-a_1)(n-a_2)|+1}}}{2}$$

$$a_{1\neq}a_2$$

$$\frac{1-i^{2^{|(n-a_1)|+1}}}{2}=\frac{1-\sin\left(\frac{\pi i^{2^{|((n-a_1))|+1}}}{2}\right)}{2}$$

2. Derivation process

Set a function as follows

$$t(n)=\frac{1-i^{2^{|n-a|+1}}}{2} \qquad 1.1$$

a∈N* n∈N*   i is Imaginary unit

when n=a t(a)=1

when n≠a t(n)=0

Use this property Set a function as follows

$$t(n)=\frac{1-i^{2^{|(n-a_1)(n-a_2)(n-a_3)(n-a_4)\ldots\ldots\ldots(n-a_m)|+1}}}{2} \qquad 1.2$$

a_m=km   k , m∈ N*

When n ∈ a_m t(a_m)=1

When n ≠ a_m t(n)=0

As follows

a_m=2m

t(n)=$\frac{1-i^{2^{(|\prod_{m=1}^{n}(n-a_m)|)+1}}}{2}$

$\prod_{m=1}^{n}(n-a_m)$ =(n-a_1)(n-a_2)(n-a_3)……(n-a_n)

=(n-2)(n-4)(n-6)(n-8)…..(n-a_n)

=$\prod_{m=1}^{n}(n-2m)$

when n ∈ 2m t(n)=1

when n not∈ 2m t(n)=0

m , n∈ N*

t(1)=0 t(2)=1 t(3)=0 t(4)=1 ………

t(2n)=1 t(2n-1)=0

so

1-t(n)=$\frac{1-i^{2^{|\prod_{m=1}^{n}(n-(2m-1))|+1}}}{2}$

2*2	2*3	2*4	2*5 ……	2(m+1)
3*2	3*3	3*4	3*5 ……	3(m+1)
4*2	4*3	4*4	4*5 ……	4(m+1)
5*2	5*3	5*4	5*5 ……	5(m+1)
6*2	6*3	6*4	6*5 ……	6(m+1)

.   .   .   .

.   .   .   .

.   .   .   .

.   .   .   .

.   .   .   .

(k+1)*2   (k+1)*3   (k+1)(m+1)

K , m ∈ N*

H(n)=

$$\left(\prod_{m=1}^{n}(n-2(m+1))\right)\left(\prod_{m=1}^{n}(n-3(m+1))\right)\ldots\ldots\ldots\ldots$$

$$=\left(\prod_{k=1}^{n}\left(\prod_{m=1}^{n}(\mathrm{n}-(\mathrm{k}+1)(\mathrm{m}+1)\right)\right)\qquad 1.3$$

When n ∈ Composite number

H((k+1)(m+1))=0

When n not∈ Composite number

|H(n)| ∈ N*

So this formula

$$h(n)=\frac{1-i^{2^{|H(n)|+1}}}{2}$$

When n ∈ Composite number

h(n)=1

When n not∈ Composite number

h(n)=0

so

when n ∈ prime number or 1

$$h(n)=\frac{1-i^{2^{|H(n)|+1}}}{2}=0$$

and so

$$1-\frac{1-i^{2^{|H(n)|+1}}}{2}=1$$

So The Number of primes for 1 to n as follows

n,k,m∈ N*

P(n)=

$$1-\frac{1-i^{2^{|H(n)|+1}}}{2}=1-\frac{1-i^{2^{\left|\left(\prod_{k=1}^{n}\left(\prod_{m=1}^{n}(\mathrm{n}-(\mathrm{k}+1)(\mathrm{m}+1)\right)\right)\right|+1}}}{2}$$

Number of primes =

$$\sum_{1}^{n} P(n)$$

=

$$\sum_{1}^{n}\left(1-\frac{1-i^{2^{|H(n)|+1}}}{2}\right)$$

=

$$\sum_{1}^{n}\left(1-\frac{1-i^{2^{\left|\left(\prod_{k=1}^{n}\left(\prod_{m=1}^{n}(\mathrm{n}-(\mathrm{k}+1)(\mathrm{m}+1)\right)\right)\right|+1}}}{2}\right.$$

)

So the Prime density formula s(n)

$$= \frac{\sum_1^n \left(1 - \frac{1 - i^{2\left|\left(\prod_{k=1}^{n}\left(\prod_{m=1}^{n}(\mathrm{n}-(\mathrm{k}+1)(\mathrm{m}+1)\right)\right)\right|+1}}{2}\right)}{n}$$