The Symmetry of N-domain and Hibert's Eighth Problem

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Abstract In this paper, we discuss the symmetry of N-domain and we find that using the symmetry characters of Natural Numbers we can give proofs of the Prime Conjectures: Twins Prime Conjecture、Goldbach Conjecture and Reimann Hypothesis.

Keywords N domain Prime Conjectures

1. The proof of Twin Primes Conjecture and Goldbach conjecture

We have

$N\sim\left(0\ ,1\ ,2\ ,3\ ,4\ ,\ \ldots\ldots\ldots\right)$ all the natural numbers

$n\sim\left(1\ ,2\ ,3\ ,4\ ,\ \ldots\ldots\ldots\right)$ all the natural numbers excepted 0

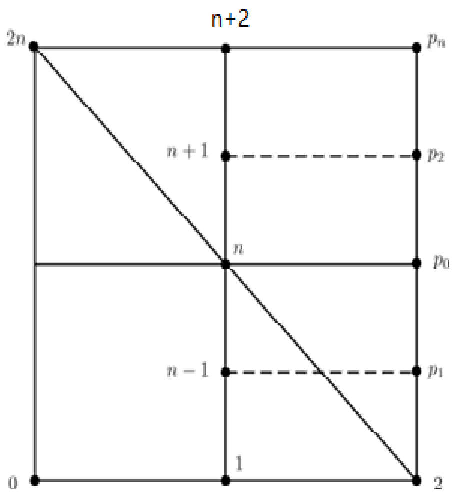
$P\sim\left(2\ ,3\ ,5\ ,7\ ,\ \ldots\ldots\ldots\right)$ all the prime numbers

$p\sim\left(3\ ,5\ ,7\ ,\ \ldots\ldots\ldots\right)$ all the odd prime numbers

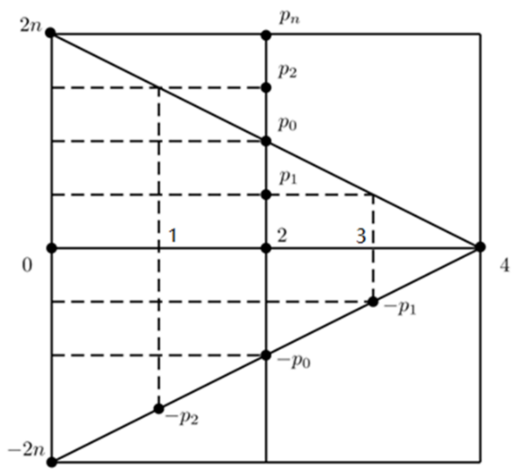
We notice that

$$N\sim\left(0\ ,n\right)$$

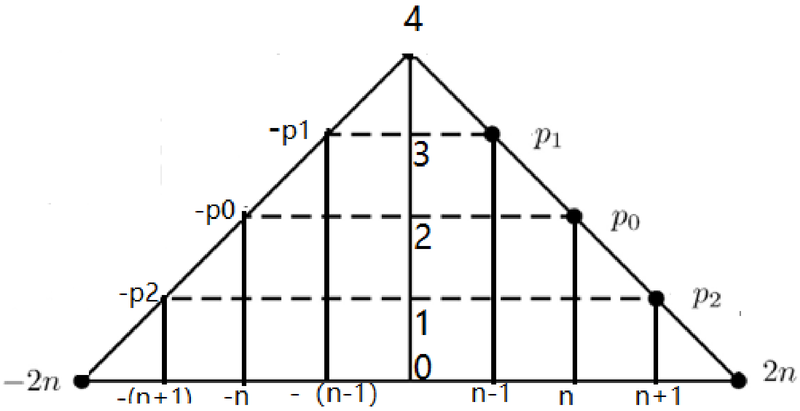
$$P\sim\left(2\ ,p\right)$$



(a)



(b)



(c)

Fig.1. The Symmetry of N-domain

We can define a N domain as 2n×2 We have a square with the vertexes are

$$0、2n、pn、2$$

with the center point of this square is n

And we can constructure a N, P coordinate system show as on figure.1 (a)

The Horizontal axis has 3 points: 0 1 2

The N number axis have 2 points :

$$0 \quad 2n$$

The n number axis have 5 points :

$$1 \;,\; n-1 \;,\; n \;,\; n+1 \quad n+2$$

The P number axis have 5 points: 2 p1 p0 p2 pn $\quad p0\;,\; p1，p2，pn \in p$

we can also get

$$p1 \to n-1$$
$$p0 \to n$$
$$p2 \to n+1$$
$$pn \to n+2$$

And extend this domain to (0,1,2,3,4) and (-2n,2n) as as show on figure.1 (b)

$$-p1 \to -(n-1)$$
$$-p0 \to -n$$
$$-p2 \to -(n+1)$$

And we can get a **pyramid structure of all natural numbers as show on figure.1(c)**

So we have

$$p2 - p1 \to n + 1 - \big(-(n-1)\big) = 2n$$

This is the proof of Polignac's conjecture. And when n=1

$$p2 - p1 = 2$$

This is the proof of Twin Primes Conjecture.

And

$$2n = n + 1 + n - 1 \to p2 + p1$$

And $n-1>2 \quad n>3 \qquad$ So $2n>6$

This mean that every even number bigger than six can be divided into two odd prime numbers in N domain. **This is the proof of Goldbach conjecture.**

2. The Proof of Riemann Hypothesis.

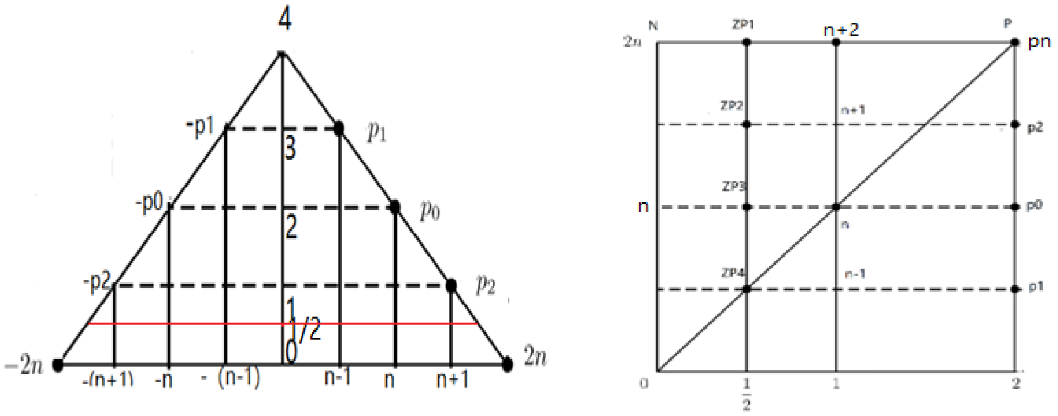


Fig.2.1 The pyramid structure of all natural numbers with a 1/2 line

The 1/2 number axis have 5 points :

$$1/2\ ,\ zp1\ ,\ zp2\ ,\ zp3\ ,\ zp4$$

Riemann Zeta-Function is

$$\xi\ (s)=\sum_{n=1}\frac{1}{n^s}=\prod\frac{1}{1-p^s} \qquad (s=a+bi)$$

Riemann Hypothesis: all the Non-trivial zero-point of Zeta-Function $Re(s)={}^1/_2$.

We have

0=1/2-1/2

1=1/2+1/2

i^2= -1

1/2=1/2*(1/2+1/2i)(1/2-1/2i)

$$\mathbf{1}+\begin{bmatrix}\mathbf{1} & \boldsymbol{i} & \mathbf{0}\\ \mathbf{0} & \frac{\mathbf{1}}{\mathbf{2}} & \mathbf{1}\\ \mathbf{1} & -\boldsymbol{i} & \mathbf{0}\end{bmatrix}\begin{bmatrix}{}^{\mathbf{1}}/_{\mathbf{2}} & \mathbf{1}-\boldsymbol{i}\ \cdots\cdots\ \mathbf{1}/\boldsymbol{n}-\boldsymbol{ni}\\ \mathbf{1}+\boldsymbol{i} \quad {}^{\mathbf{1}}/_{\mathbf{2}} & \cdots\cdots\cdots\cdots\\ \cdots\cdots\cdots\cdots\ {}^{\mathbf{1}}/_{\mathbf{2}} & \cdots\cdots\cdots\cdots\\ \mathbf{1}/\boldsymbol{n}+\boldsymbol{ni} & \cdots\cdots\cdots\cdots\ {}^{\mathbf{1}}/_{\mathbf{2}}\end{bmatrix}=\mathbf{0}$$

The tr(A)=1/2*N

This is mean that all the non-trivial Zero points of Riemann zeta-function are on the 1/2 axis just show as Fig.2.2 This is the proof of Riemann Hypothesis

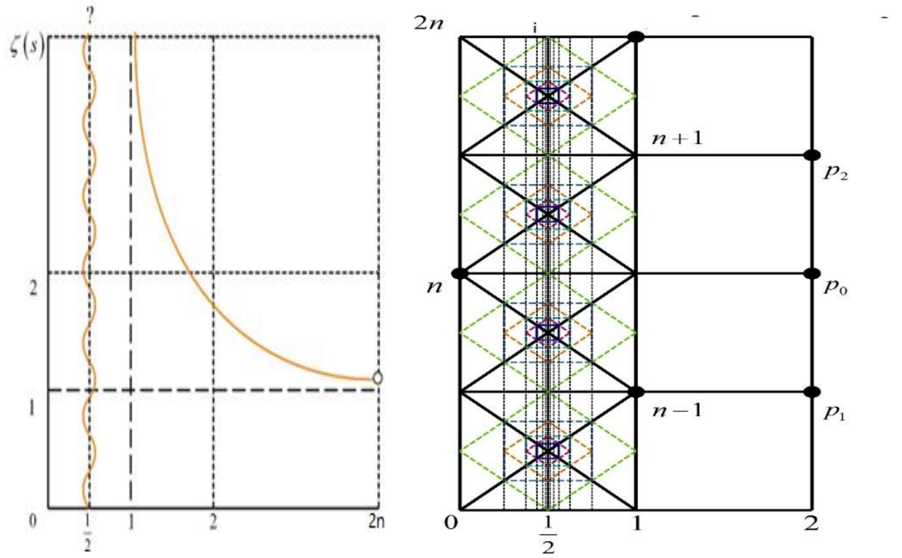


Figure.2.2 all the non-trivial Zero points of Riemann zeta-function are on the 1/2 axis

In fact, we should notice to :

$$1+\frac{e^{ip\pi}-e^{i2n\pi}}{\sum\frac{1}{2^N}=2}=0$$

$N\sim\left(0\ ,\ 1\ ,\ 2\ ,\ 3\ ,\ 4\ ,\ \ldots\ldots\ldots\right)$ all the natural numbers.

p$\sim\left(3\ ,\ 5\ ,\ 7\ ,\ \ldots\ldots\ldots\right)$ all the odd prime numbers.

$$\mathbf{e}=\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{n}$$

$$\frac{\pi^2}{6}=\sum_{n=1}^{\infty}\frac{1}{n^2}$$

this equation gives a structure of all N and P and a 1/2 fixed point.

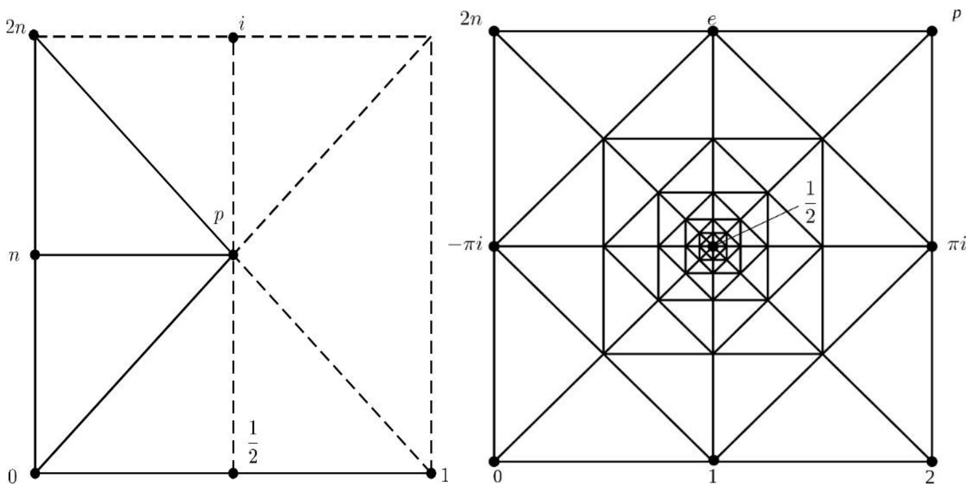


Fig.2.3. **The symmetry structure of all N and P and a 1/2 fixed point.**