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

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

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

$P\sim(2, 3, 5, 7, \dots\dots\dots)$ all the prime numbers

$p\sim(3, 5, 7, \dots\dots\dots)$ all the odd prime numbers

We notice that

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

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

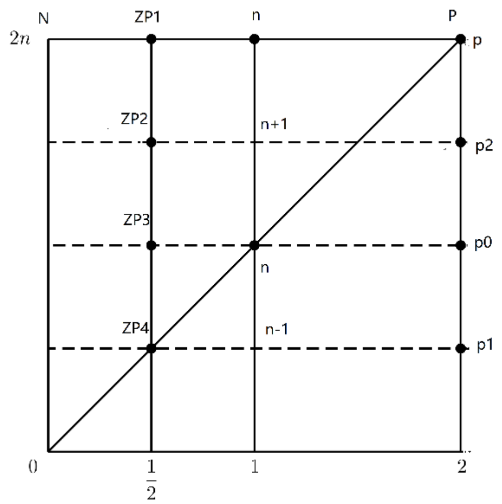

Fig.1. The Symmetry of N-domain

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

$$0、2n、p、2$$

with the center point of this square is n

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

The Horizontal axis has four numbers: 0 1/2 1 2

The N number axis have 2 points :

$$0 \quad 2n$$

The 1/2 number axis have 5 points :

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

The n number axis have 4 points :

$$0\ , n-1\ , n\ , \mathrm{n}+1$$

The P number axis have 5 points: 2 p1 p0 p2 p

we can also get

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

$$p0\ ,\ \ p1,\ p2 \in p$$

We have

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

Because we have infinite prime numbers. This mean that we have infinite twin primes in N domain. **This is the proof of Twin Primes Conjecture.**

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

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.

Riemann Zeta-Function is

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

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

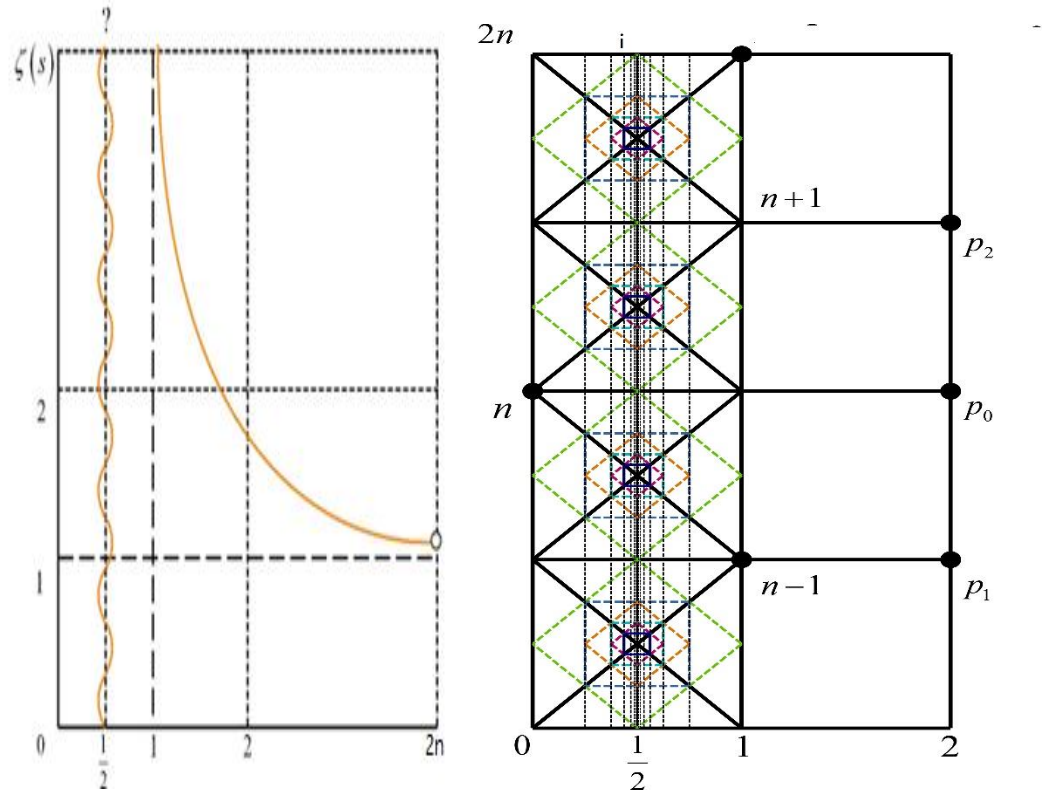

Figure.2. all the non-trivial Zero points of Riemann zeta-function are on the 1/2 axis

We have

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

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. This is the proof of Riemann Hypothesis

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.

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

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

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

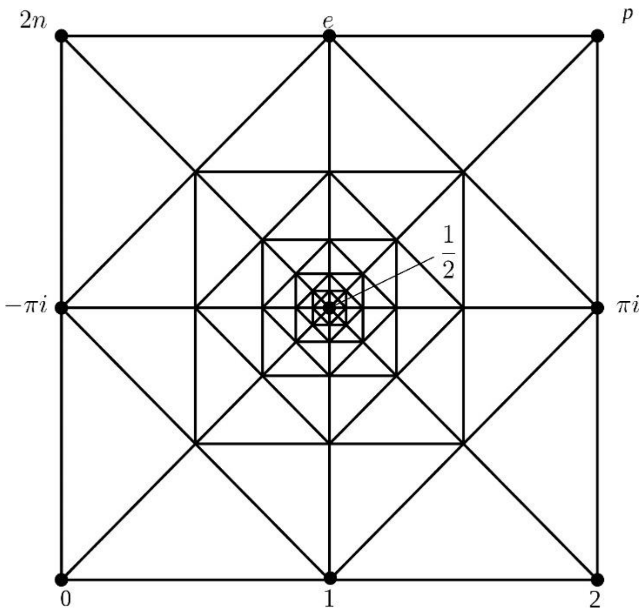

Fig.3. **The symmetry structure of all N and P and a 1/2 fixed point.**