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

The Symmetry of N-domain

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

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

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

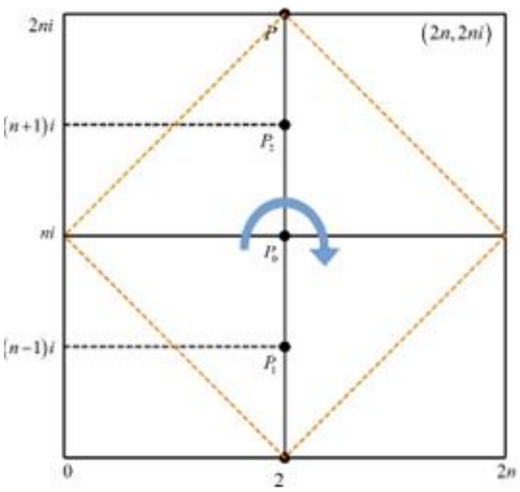

Fig.1. **N domain as 2n×2n**

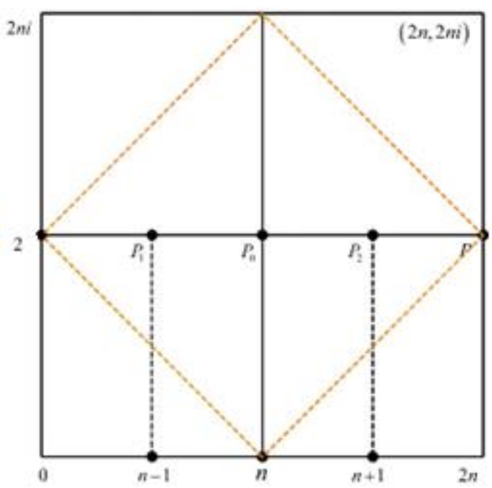

Fig2. **the Symmetry of P axis**

We can define a N domain as 2n×2n with the center point of this square is

$$p0 =< n，ni > \ and\ n \in p$$

We have a square with the vertexes are

$$0、2ni、 < 2n , 2ni > 、2n$$

And we can constructure a N, P coordinate system show as on figure.1.:
The N number axis have 3 points :

$$0 , 2 , 2n$$

And at the P number axis:
Prime number 2 is the point 2.
All the odd prime number can be indicated as:

$$2\ p1\ \ p0、p2、p$$

we can also get

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

$$p1，p2 \in p$$

The proof of Twin Primes Conjecture and Goldbach conjecture

And we can have a clockwise rotation of P axis and $p0$ *as* ***the fixed point*** **show as on figure** *2.*

We have

$$p0 \to n$$

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

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.**

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

And $n-1 > 2 \quad n > 3$ 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.**

The Proof of Riemann Hypothesis.

Riemann Zeta-Function is

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

Riemann Hypothesis: all the Non-trivial zero-point of Zeta-Function $Re(s) = {}^{1}/_{2}$.

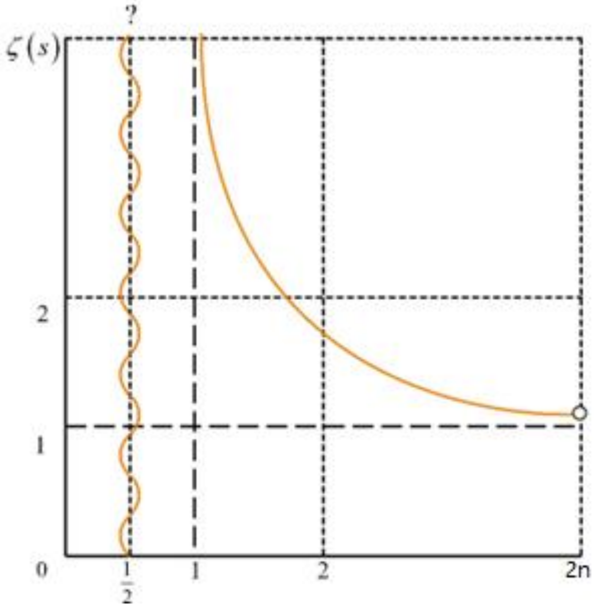

Figure.3. Riemann Zeta-Function on N domain

Because

$$\mathbf{1/2 = (1/2 + 1/2 \bullet \boldsymbol{i})(1/2 - 1/2 \bullet \boldsymbol{i})}$$

We can get circles with $1/2$ and the intersections with the axis are:

$$Zp1, Zp2, Zp3, Zp4$$

All of them on the symmetry of 1/2 points.

We can get circles with $p0$ and the intersections with the axis are:

$$1, p0 + \frac{1}{2}, 2, p0 - \frac{1}{2}$$

We can get circles with $\boldsymbol{p0} \in \boldsymbol{p}$ and the intersections with the axis are

$$Zp1、Zp2、zp3、Zp4$$

Just show as the figure.4.

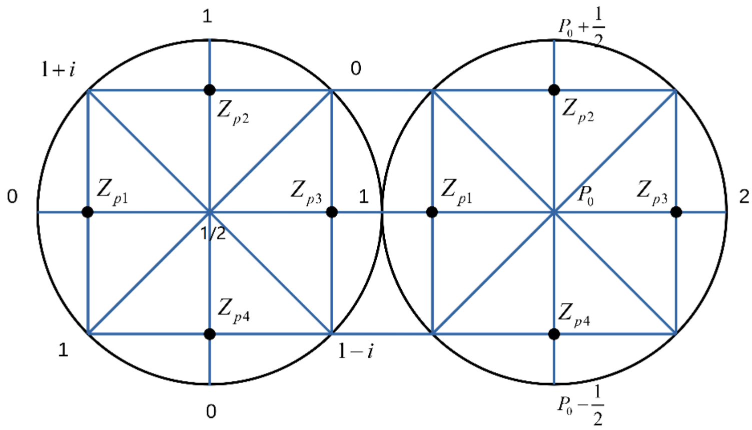

Figure.4. Zero points with a symmetry of 1/2 point

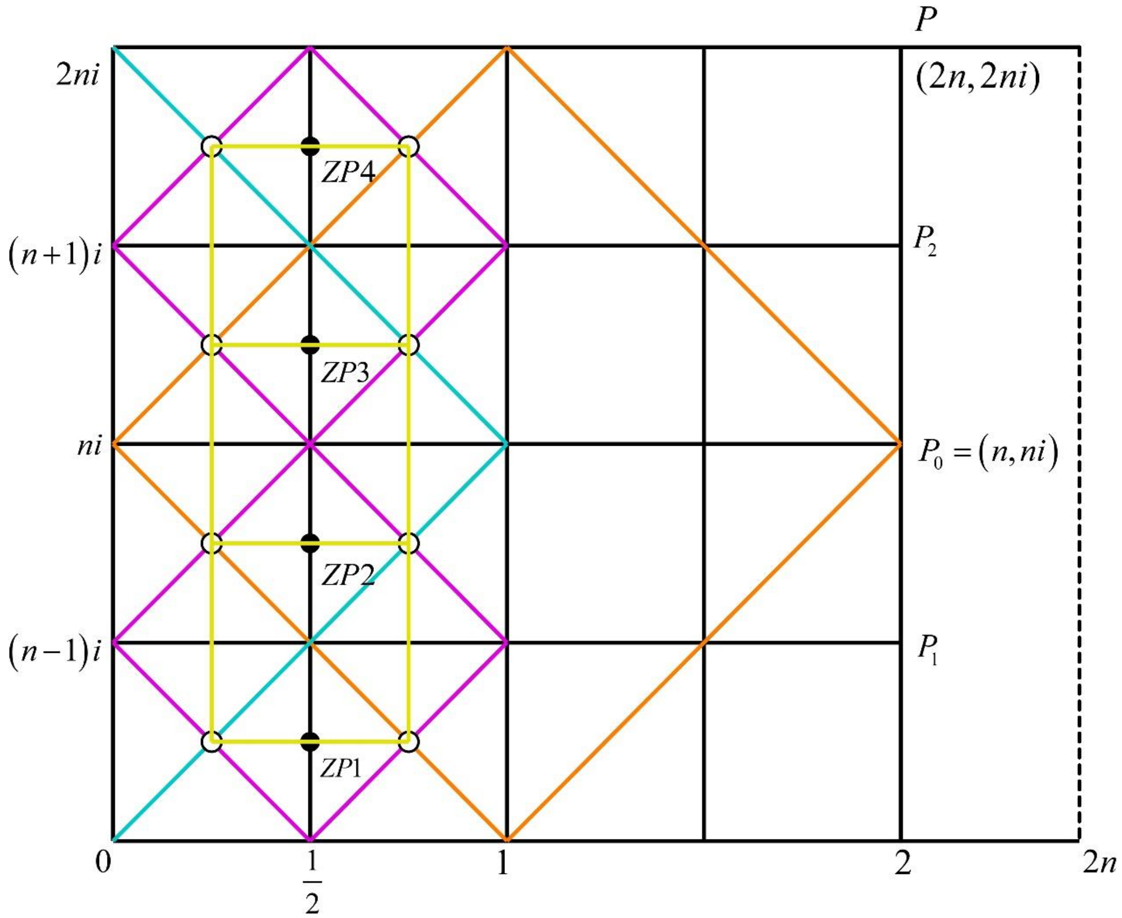

Fig.5. **The symmetry of zero-points on the N-P domain**

we have

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

The tr(A)=1/2*N

All the Zero points are on the 1/2 axis just show as on Figure.5. We think 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.

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