The Symmetry of S∞+i and Number Conjectures

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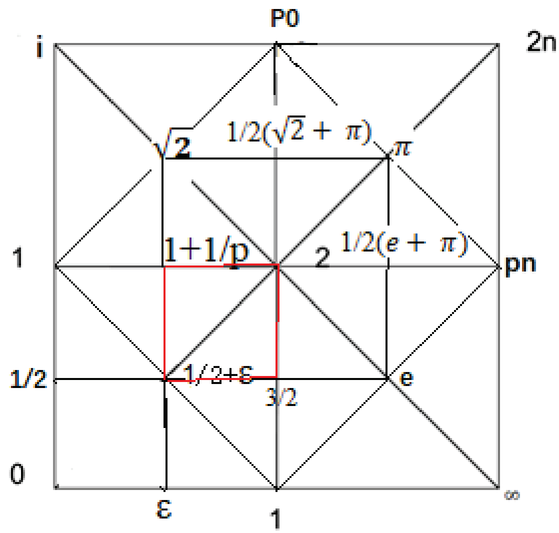
Abstract In this paper, we discuss the symmetry of **S∞+i** and we find that using the symmetry characters of **S∞+i** , we can give proofs of the Hodge Conjecture and the Prime Conjectures: Goldbach Conjecture、Polignac's conjecture and Twins Prime Conjecture. And we also give a proof of Collatz conjecture.

Keywords S∞+i Prime Conjectures



(0<ε≤1/2)

Fig.1. The Symmetry of S∞+i

0=1/2-1/2 1=1/2+1/2

1+1=2 $(\sqrt{2})^2 = 1^2 + 1^2$

$0 < \varepsilon \leq \frac{1}{2}$

$i^2 + 1 = 0$

$\infty = 1 + 1 + 1 + \cdots$

$\sum 1/2^N = 2$

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

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

N~(0,1,2,3……) All natural numbers

n~$\left(1, 2, 3, 4, \ldots\ldots\right)$ All natural numbers excepted 0

P~$\left(3\ ,\ 5\ ,\ 7\ ,\ \ldots\ldots\ldots\right)$ All odd prime numbers

p0∈P <2n pn∈P >2n

Zp=1/2+ε $(0 < \varepsilon \leq \frac{1}{2})$ **this is the proof of generalized Riemann hypothesis.**

(GRH)

$$\begin{bmatrix} 1 & 1+1/p & \mathbf{2} \\ 1/2 & \frac{1}{2}+\varepsilon & 3/2 \\ 0 & \varepsilon & 1 \end{bmatrix}\begin{bmatrix} \sqrt{2} & 1/2(\sqrt{2}+\pi) & \pi \\ 1+1/p & \mathbf{2} & 1/2(e+\pi) \\ \frac{1}{2}+\varepsilon & 3/2 & e \end{bmatrix}\begin{bmatrix} i & p0 & 2n \\ 1 & \mathbf{2} & pn \\ 0 & 1 & \infty \end{bmatrix}$$

$$\begin{bmatrix} 1/2 & \frac{1}{2}+\varepsilon \\ 0 & \varepsilon \end{bmatrix}\begin{bmatrix} 1+1/p & 2 \\ \frac{1}{2}+\varepsilon & 3/2 \end{bmatrix}\begin{bmatrix} p0 & 2n \\ 2 & pn \end{bmatrix}$$

This is the proof of the hodge conjecture.

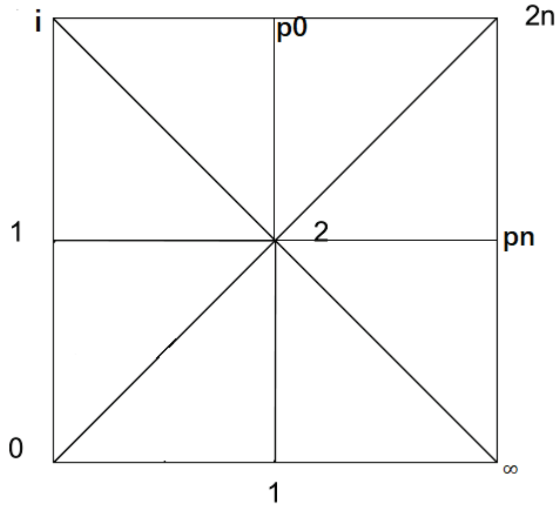


Fig.2. The Symmetry of Spn+p0

We can construct S$_{Pn+p0}$ as figure.2.

the matrix is :

$$\begin{bmatrix} i & p0 & 2n \\ 1 & 2 & pn \\ 0 & 1 & \infty \end{bmatrix}$$

We have

$$1+i^2=0$$
$$0=1-1 \quad 2=1+1$$
$$\infty=1+1+1+1+\cdots$$

n~$\left(1\ ,\ 2\ ,3\ ,4\ ,\ \ldots\ldots\ldots\right)$ All natural numbers excepted 0

P~$\left(3\ ,5\ ,7\ ,\ \ldots\ldots\ldots\right)$ All odd prime numbers

p0∈P <2n pn∈P >2n

So we have:

$$p0 - 2 = pn - 2n \rightarrow\ 2(n+1) = \ p0 + pn \qquad n \sim \left(2\ ,\ 3\ ,\ 4\ ,\ \ldots\ldots\ldots\right)$$

This is the proof of Goldbach conjecture.

$$2n - p0 = pn - 2 \rightarrow\ pn - p0 = \ 2(n-1) \qquad n \sim \left(1\ ,\ 2\ ,\ 3\ ,\ 4\ ,\ \ldots\ldots\ldots\right)$$

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

$$n = 2$$

$$pn - p0 = 2$$

This is the proof of Twin Primes Conjecture.

Collatz Conjecture:

$$f(n) = \begin{cases} \dfrac{n}{2} & if n \equiv 0\ (mod 2) \\ 3n+1 & if n \equiv 1\ (mod 2) \end{cases}$$

$k \in N\ \rightarrow f^k(n) = 1$
We can get figure.3

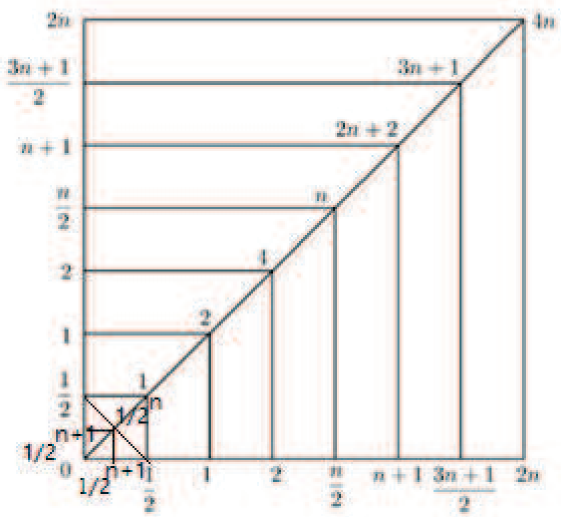


Fig.3 The Symmetry of S_{2n+2n}

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

we have:

$$\frac{n}{\frac{n}{2}} = \frac{3n+1}{\frac{(3n+1)}{2}} = \frac{2n+2}{n+1} = \frac{4n+2n+2}{3n+1} = \frac{4n+4}{2n+2} = \frac{4n}{2n} = \frac{4}{2} = \frac{2}{1} = \frac{1}{\frac{1}{2}}$$

$$= 2 = \sum \frac{1}{2^N}$$

N~ (0, 1, 2,3,4……) all natural numbers. **This is a concise proof of Collatz Conjecture.**

Bibliography

[1] Weisstein, Eric W. " Goldbach conjecture." From *MathWorld*--A Wolfram Web Resource. https://mathworld.wolfram.com/ Goldbach conjecture.html