

Proof of the Riemann hypothesis

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Abstract

In the previous paper “Consideration of the Riemann hypothesis” $c = 0.5$ and x is non-trivial zero value, and it was described that it converges to 0, but a serious proof in mathematical expression could not be obtained.

In this paper, we will give a proof of mathematical expression.

”the non-trivial zero values of all positive infinity and negative infinity lie on the real value 0.5” I am here explained.

introduction

I found the following formula in the previous paper “Consideration of the Riemann hypothesis”.

$$\sum_{n=1}^{\infty} \left[\frac{\cos(x \ln(2n-1)) + i \sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n)) + i \sin(x \ln(2n))}{(2n)^c} \right] \quad (1)$$

$$\sum_{n=1}^{\infty} \left[\frac{\sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\sin(x \ln(2n))}{(2n)^c} \right] \quad (2)$$

$$\sum_{n=1}^{\infty} \left[\frac{\cos(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n))}{(2n)^c} \right] \quad (3)$$

In my previous paper(although it have not published yet), I showed that when $c=0.5$ and x is a non-trivial zero value, equation (1),(2) and (3)=0
 x is treated as a real number, x is a non-trivial zero values.

Discussion

From equation (1), it is estimated that \cos is a real value and \sin is an imaginary value. When this real value and the imaginary value reach zero simultaneously, they become non-trivial zero values.

$$\frac{\sin^2[x \ln(2n)]}{(2n)^c} + \frac{\cos^2[x \ln(2n)]}{(2n)^c} \quad (4)$$

$$= 2^{-2c} n^{-2c} [\sin^2[x \ln(2n)] + \cos^2[x \ln(2n)]] \quad (5)$$

$$= 2^{-2c} n^{-2c} \quad (6)$$

$$\int 2^{-2c} n^{-2c} dn = 2^{-2c} \int n^{-2c} dn = \frac{n^{1-2c}}{4^c(1-2c)} + k \quad (7)$$

$$\lim_{c \rightarrow 0.5^-} \frac{n^{1-2c}}{4^c(1-2c)} = \infty \quad (8)$$

The fact that the area(two dimensional) becomes positive infinity means that the straight line(one dimensional) also becomes positive infinity.

As c approaches 0.5, from the negative side, the area becomes infinite in the positive direction.

That is, it takes all non-trivial zero values in the positive direction.

$$\lim_{c \rightarrow 0.5^+} \frac{n^{1-2c}}{4^c(1-2c)} = -\infty \quad (9)$$

The fact that the area(two dimensional) becomes negative infinity means that the straight line(one dimensional) also becomes negative infinity.

As c approaches 0.5 from the positive side, the area becomes infinite in the negative direction.

That is, it takes all non-trivial zero values in the negative direction.

Currently, no negative area is observed.

It is obvious that non-trivial zero values are distributed in the positive and negative directions with zero as a symmetry.

No exact proof could not be obtained by mathematical expressions. I could not deny the possibility that c was a value very close to 0.5.

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In the formulas (1), (2) and (3).

Also, it was impossible to deny the possibility that x was a value close to the value of the non-trivial zero.

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In the formulas (1), (2) and (3).

However, if the value is very close to 0.5 as in the above equation, (8) (9) takes the plus limit or the minus limit.

That is, x is not a value close to a non-trivial zero, but a non-trivial zero itself. And the value of c from equation (1) to equation (4) must be 0.5 itself.

References

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key words

Riemann hypothesis, infinite series, negative and positive infinity

Please raise the prize money to my little son and daughter who are still young.