Proof of the Riemann hypothesis

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Abstract

In my 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 almost 0, but a serious proof in mathematical expression could not be obtained. In this paper, we 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 mathematically proved.

introduction

\[ \zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} \quad s = a + ix \]  

\[ a=0.5 \quad x \text{ is non-tribial zero value.} \]

\[ \zeta(s) = 0 \text{ and } \zeta(1 - s) = 0 \]  

\[ \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^{2c}} = \sum_{n=1}^{\infty} \left[ \frac{1}{(2n-1)^{2c}} - \frac{1}{(2n)^{2c}} \right] = \sum_{n=1}^{\infty} \frac{1}{(2n-1)^{2c}} - \sum_{n=1}^{\infty} \frac{1}{(2n)^{2c}} \]  

\[ 0 \leq c \leq 1 \]

\[ \frac{1}{(2n-1)^{2c}} = \frac{(2n-1)^{ix}}{(2n-1)^{c}} = \frac{\cos(x \ln(2n-1)) + i \sin(x \ln(2n-1))}{(2n-1)^c} \]  

\[ \frac{1}{(2n)^{2c}} = \frac{(2n)^{ix}}{(2n)^c} = \frac{\cos(x \ln(2n)) + i \sin(x \ln(2n))}{(2n)^c} \]
\[ \sum_{n=1}^{\infty} \left[ \frac{\cos(x \ln(2n-1)) + i \sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n)) + i \sin(x \ln(2n))}{(2n)^c} \right] \quad (7) \]

Although \( x \) is treated as a real number, \( x \) is a non-trivial zero values.

From equation Eq.(7), 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.

c is complex number but treated as a real number.

\[ \sum_{n=1}^{\infty} \left[ \frac{\cos(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n))}{(2n)^c} \right] \quad (8) \]

\[ \sum_{n=1}^{\infty} \left[ \frac{\sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\sin(x \ln(2n))}{(2n)^c} \right] \quad (9) \]

And, from [5](it is my previous paper “Consideration of the Riemann hypothesis”)
In the paper, equation Eq.(8) is calculated as \( x= \) non-trivial zero value.

(Summary 1)
If \( c \) shifts to 0.00001, it converge around -1.69.
If \( c \) shifts to 0.1, it converge around -1.04.
If \( c \) shifts to 0.2, it converge around -0.462.
If \( c \) shifts to 0.3, it converge around -0.745.
If \( c \) shifts to 0.4, it converge around -0.200.
If \( c \) shifts to 0.49, it converge around -0.02.
If \( c \) shifts to 0.499, it converge around -0.009.
If \( c \) shifts to 0.4999, it converge around -0.0002.
If \( c \) shifts to 0.49999, it converge around -0.00003.
If \( c \) shifts to 0.499999, it converge around -0.0000016.
If \( c \) shifts to 0.4999999, it converge around -0.0000077.

If \( c \) shifts to 0.5000001, it converge around 0.0000089.
If \( c \) shifts to 0.500001, it converge around 0.000017.
If \( c \) shifts to 0.50001, it converge around 0.00003.
If \( c \) shifts to 0.5001, it converge around 0.0002.
If \( c \) shifts to 0.501, it converge around 0.009.
If \( c \) shifts to 0.51, it converge around 0.02.
If \( c \) shifts to 0.6, it converge around 0.199.
If \( c \) shifts to 0.7, it converge around 0.349.
If \( c \) shifts to 0.8, it converge around 0.477.
If \( c \) shifts to 0.9, it converge around 0.583.
If \( c \) shifts to 0.99999, it converge around 0.67.

From the above, it can be seen that deviates from 0.5, the converging value deviates from zero. However, it lacks rigor.

**Discussion**

If \( c = 0.5 \) and \( x \) is non-trivial zeros, Eq.(8)=0 and Eq.(9)=0 must hold.

Eq.(8)(9) converges when \( 0 \leq c \leq 1 \).

There seems to be the inclination that \( c \) converges at the time of other values, but does not check it because it is important, and there is not it.

In order to converge to 0, no divergence occurs and convergence is the minimum condition. If \( c \) is less than 0.5 \( (c \ll 0.5) \).

It converges to a negative number instead of 0 [see (Summary 1)].

It can not be concluded that \( c = 0.5 \) as far as the above-mentioned (Summary 1). is examined to what value it converges.

This is because the possibility of being near the pole of \( c = 0.5 \) can not be denied.

Thease be must satisfy Eq.(2).

It is only 0.5 that satisfies Eq.(2).

In order to converge to 0, \( c = 0.5 \) is required.

It is impossible to converge to 0 unless \( c = 0.5 \).

It can be treated and proved as an infinite series.

\[
    c = \frac{1}{2}
\]  

proof complete.
References


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.