Proof of the Riemann hypothesis

Toshiro Takami
mmm82889@yahoo.co.jp

Abstract
I proved Riemann hypothesis.
It proved that it never takes a zero point if $0<a<0.5$, $0.5<a$.
There are many zeros such as $0.5+i14.1347$, but all the known zero points are on the 0.5 axis.
I used the smallest prime number 2.

Introduction

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

\[
\zeta(s) = \frac{2^s}{2^s - 1} \frac{3^s}{3^s - 1} \frac{5^s}{5^s - 1} \frac{7^s}{7^s - 1} \cdots \quad (2)
\]

\[
\frac{\zeta(s)}{\zeta(1 - s)} = \frac{(2\pi)^s}{2\Gamma(s) \sin\left(\frac{s\pi}{2}\right)} \quad (3)
\]

\[
\frac{\zeta(s)}{\zeta(1 - s)} = \pi^{-\frac{1-s}{2}} \Gamma\left(\frac{1-s}{2}\right) \quad (4)
\]
**Discussion**

**(Proof Part 1)**

(3) is Euler formula, from (3), calculate only the right side.

\[
\frac{2}{(2\pi)^s}\Gamma(s)\sin\left(\frac{s\pi}{2}\right), \{s=0.49\}=1.02256
\]

\[
\frac{2}{(2\pi)^s}\Gamma(s)\sin\left(\frac{s\pi}{2}\right), \{s=0.5\}=1
\]

\[
\frac{2}{(2\pi)^s}\Gamma(s)\sin\left(\frac{s\pi}{2}\right), \{s=0.51\}=0.97794
\]

This formula is 1 only when \(a=0.5\).

(4) is Riemann formula, from (4), calculate only the right side.

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.48\}=1.11348
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.49\}=1.0552
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.495\}=1.02723
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.499\}=1.00539
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.5\}=1
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.501\}=0.994642
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.505\}=0.973496
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.51\}=0.947691
\]

\[
\left(\pi^{\frac{1-s}{2}}\frac{\Gamma(s/2)}{\Gamma((1-s)/2)}\right), \{s=0.52\}=0.898088
\]

This formula is 1 only when \(a=0.5\).

\[\zeta(s) \equiv \zeta(1-s)\]

**(Proof Part 2)**
\[ \zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} \]  

\[ \zeta(s) = \frac{2^s}{2^s - 1} \frac{3^s}{3^s - 1} \frac{5^s}{5^s - 1} \frac{7^s}{7^s - 1} \ldots \]  

from (2)

(\text{prime})^s/((\text{prime})^s-1) = p^s/(p^s-1), \ s = a+bi,

If a number less than 1 is forever multiplied, (2) will be 0.

\[ 0.99999^{100000000000} = 2.2213 \ldots \times 10^{\text{-}434297} \]

and

\[ 1.00001^{1000000000} = 8.3773 \ldots \times 10^{4342} \]

However, the value of the zero point also shows an increasing trend as the value of the prime increases. Occasionally its absolute value exceeds 1, but since many absolute values are less than 1, it converges to 0.

\[ [1.00001^{100}] *[0.999999^{1000}] = 1.0009004001120541 \ldots \]
\[ [1.00001^{100}] *[0.999999^{1000000}] = 0.368247484360 \ldots \]
\[ [1.00001^{100}] *[0.999999^{1000000000}] = 1.136 \ldots \times 10^{\text{-}4343} \]

However, even (0.5 + i 14.1347), more than 1 has surprisingly appeared.

example

\[ [2^{(0.5+14.1347i)}] / [2^{(0.5+14.1347i)-1}] = 0.588742 \ldots + 0.0913854 \ldots \ i \]
\[ [3^{(0.5+14.1347i)}] / [3^{(0.5+14.1347i)-1}] = 0.634980 \ldots - 0.0417196 \ldots \ i \]
\[ [5^{(0.5+14.1347i)}] / [5^{(0.5+14.1347i)-1}] = 0.716253 \ldots + 0.166176 \ldots \ i \]
\[ [7^{(0.5+14.1347i)}] / [7^{(0.5+14.1347i)-1}] = 0.754221 \ldots - 0.155991 \ldots \ i \]
\[ [11^{(0.5+14.1347i)}] / [11^{(0.5+14.1347i)-1}] = 0.790293 \ldots - 0.118667 \ldots \ i \]
\[ [13^{(0.5+14.1347i)}] / [13^{(0.5+14.1347i)-1}] = 0.958351 \ldots + 0.273235 \ldots \ i \]
\[ [17^{(0.5+14.1347i)}] / [17^{(0.5+14.1347i)-1}] = 0.836416 \ldots - 0.123662 \ldots \ i \]
\[ [19^{(0.5+14.1347i)}] / [19^{(0.5+14.1347i)-1}] = 0.843387 \ldots + 0.116732 \ldots \ i \]
\[ [23^{(0.5+14.1347i)}] / [23^{(0.5+14.1347i)-1}] = 1.23590 \ldots - 0.106080 \ldots \ i \]
\[ [29^{(0.5+14.1347i)}] / [29^{(0.5+14.1347i)-1}] = 0.853593 \ldots + 0.061811 \ldots \ i \]
\[ [31^{(0.5+14.1347i)}] / [31^{(0.5+14.1347i)-1}] = 0.944662 \ldots + 0.163039 \ldots \ i \]
\[ [37^{(0.5+14.1347i)}] / [37^{(0.5+14.1347i)-1}] = 1.11437 \ldots - 0.145088 \ldots \ i \]
Even if it is above 0.5, if it is far from the zero point, the absolute value is large and does not appear to converge to zero.

plot[ [\text{23}^{(x+14.1347i)}] / [\text{23}^{(x+14.1347i)}-1], \{x, 0,1\} ] ....... This is not the case when using prime number 2.

\[\text{23}^{(0.5+14.1347i)} / [\text{23}^{(0.5+14.1347i)}-1]= 0.901684... - 0.102070... i\]
\[\text{41}^{(0.5+14.1347i)} / [\text{41}^{(0.5+14.1347i)}-1]= 0.870191... - 0.027885... i\]
\[\text{43}^{(0.5+14.1347i)} / [\text{43}^{(0.5+14.1347i)}-1]= 0.916285... + 0.105315... i\]
\[\text{47}^{(0.5+14.1347i)} / [\text{47}^{(0.5+14.1347i)}-1]= 1.13782... + 0.0744145... i\]
\[\text{53}^{(0.5+14.1347i)} / [\text{53}^{(0.5+14.1347i)}-1]= 1.04880... - 0.128617... i\]
\[\text{59}^{(0.5+14.1347i)} / [\text{59}^{(0.5+14.1347i)}-1]= 0.985522... - 0.126390... i\]

This is the case when using prime number 2.

plot[ [\text{29}^{(x+14.1347i)}] / [\text{29}^{(x+14.1347i)}-1]] ....... This is the case when using prime number 2.
now, \[ f(p) = p^s, \quad s = a + bi, \]

\[ (f(p))^2 = (p^{a+bi})^2 \]
Try the smallest prime number, 2.
And, let \( b = 0 \), which is the minimum absolute value.
\[ f(2) \]
gets closer to 1, but never 1. That is, \( [f(2)] < 1 \).
\[ (f(2))^2 = (2^{a+bi})^2 = 4[a^2] < 1 \]
\[ 4[a^2] < 1 \]
\[ a^2 < 0.25 \]
\[ a < sqrt(0.25) = 0.5 \]

\( a < 0.5 \) equal \( 0.5 < a \), from \( \zeta(s) \equiv \zeta(1-s) \)

if \( a < 0.5 \) and \( 0.5 < a \), \( \zeta(s) \neq 0 \).

And,
There are zero points such as \( 0.5+i14.1347, \ 0.5+i21.022, \ 0.5+i25.0108 \) etc.

\textit{Thus, there are countless zero points on} \( a = 0.5 \).

\textbf{References}


I am a psychiatrist now and also a doctor of brain surgery before.
I would like to receive an email. I will not answer the phone.

Currently 57 years old
Born on November 26, 1961
(I am very poor of English. Almost all document are google-translation.)
when converted to English by Google translation, it becomes cryptic to me.
But, I read letter by google translation.
In my case, if you translate it into English by google translation, I do not know what is written in my paper. For me, foreign languages such as English (actually not good at Japanese) is a demon.
As soon as it is translated into English, it turns into a cipher for me.

*postscript*

The cold when I found the first one is still continuing now and this may be my last post. I may have discovered another by surging my energy and it may not be counter example.
It may be written as a will.
I am writing this at the limit of power.
I write this with spitting blood.
I will post it in a hurry, as long as I have not done it before I die.