The curse of Riemann.
Proof of the Riemann hypothesis

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Abstract

Up to now, I have tried to expand this equation and prove Riemann hypothesis with the equation of cos, sin, but the proof was impossible.

However, I realized that a simple formula before expansion can prove it.

The real value is zero only when the real part of s is 1/2. Non-trivial zeros must always have a real value of zero.

key words
Riemann hypothesis, non-trivial zeros, critical line, 1/2

1 introduction

$2^{0.5+i14.1347}\pi^{-0.5+i14.1347}\sin((0.5+i14.1347)\pi/2)\Gamma(0.5-i14.1347) = -0.950558... - 0.310547...i$
$2^{0.5+i21.022}\pi^{-0.5+i21.022}\sin((0.5+i21.022)\pi/2)\Gamma(0.5-i21.022) = -0.904282... + 0.426936...i$
$2^{0.5+i25.0109}\pi^{-0.5+i25.0109}\sin((0.5+i25.0109)\pi/2)\Gamma(0.5-i25.0109) = -0.784761... - 0.619798...i$

In the calculation above, Euler's formula Eq.(1) has a non-trivial zero value of $\zeta(s) = 0$.
The other element, $2^s\pi^{s-1}\sin(\frac{s\pi}{2})\Gamma(1-s)$, indicates that $\zeta(s) = 0$ is not useful.
It is $\zeta(1-s) = 0$ that is useful for $\zeta(s) = 0$. That is, Eq.(2).

$$\zeta(s) = 2^s\pi^{s-1}\sin\left(\frac{s\pi}{2}\right)\Gamma(1-s)\zeta(1-s) \tag{1}$$

$$\zeta(s) = \zeta(1-s) = 0 \tag{2}$$

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$$\eta(s) = \eta(1-s) = 0 \tag{3}$$

This is clear from $\zeta(s) = \frac{2^s}{2^s-2}\eta(s)$, that Eq.(2) and Eq.(3) have the same significance.
Both equations are valid only for non-trivial zeros.

In the case of $\eta(s)$, the proof of Riemann hypothesis is completed if it is proved that the value of the non-trivial zeros is taken only when the real part is 1/2.

Define $\quad 0 < \Re(s) < 1$

$$\eta(s) = \frac{2^s-2}{2^s}\zeta(s) = \zeta(s) - \frac{2}{2^s}\zeta(s) \tag{4}$$

2 Discussion

from Eq.(9)

$$\zeta(s) = \eta(s) + \frac{2}{2^s}\zeta(s) \tag{5}$$

and

$$\zeta(1-s) = \eta(1-s) + \frac{2}{2^{1-s}}\zeta(1-s) \tag{6}$$

from $\zeta(s) = \zeta(1-s)$

$$[\eta(s) + \frac{2}{2^s}\zeta(s)] - [\eta(1-s) + \frac{2}{2^{1-s}}\zeta(1-s)] = 0 \tag{7}$$

$$[\eta(s) - \eta(1-s)] + [\frac{2}{2^s}\zeta(s) - \frac{2}{2^{1-s}}\zeta(1-s)] = 0 \tag{8}$$

$$[\eta(s) - \eta(1-s)] + [2^{1-s}\zeta(s) - 2^s\zeta(1-s)] = 0 \tag{9}$$

As can be seen from Eq.(9), it becomes 0 when s=1/2 is inserted.
That is, it is not 0 except for s=1/2.
This can be said to be the end of proof.

from Eq.(7)
$\{[\eta(s) + \frac{2}{2^s}\zeta(s)] - [\eta(1-s) + \frac{2}{2^{1-s}}\zeta(1-s)]\}, \{s = 0.4 + i16.1347\} = -0.493359... + 3.65957...i$
$\{[\eta(s) + \frac{2}{2^s}\zeta(s)] - [\eta(1-s) + \frac{2}{2^{1-s}}\zeta(1-s)]\}, \{s = 0.4 - i16.1347\} = -0.493359... - 3.65957...i$

$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=1/2+i14.1347\}=0.000055107...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=1/2+i16.1347\}=3.64713...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=0.6+i16.1347\}=0.493359+3.65957...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=0.6-i16.1347\}=0.493359...-3.65957...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=1/2+i17.1347\}=5.39992...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=1/2+i21.022\}=0.000077614...i$
$\{[\eta(s)+\frac{2}{2^s}\zeta(s)]-[\eta(1-s)+\frac{2}{2^{1-s}}\zeta(1-s)]\},\{s=1/2+i22.022\}=-2.61712...i$

As in these examples, when the real part is 1/2, the real value is 0, but the imaginary value remains.
When the real value of s is 1/2, the real value is completely 0, but even if the imaginary value is i14.1347, it is not removed because it contains an error.

In $\zeta(s)$ and $\eta(s)$, even if the imaginary value of s is changed, the real value shows the same value, but the imaginary value is different between plus and minus.

If the real part of s is 0.4, the real part of s is 0.6 from $\zeta(s)=\zeta(1-s)$.
Then, the real part value and the imaginary part value also change.
Even if $\zeta(s)=\zeta(1-s)$ is used in addition to 1/2, the value of the real part is only 1/2.

s = 1/2 is the minimum requirement for $\zeta(s)=\zeta(1-s)$ and $\eta(s)=\eta(1-s)$.
That is, the minimum condition for the non-trivial zeros is that the real value is 1/2.

The real value is zero only when the real part of s is 1/2. Non-trivial zeros must always have a real value of zero.

$$\Re(s)=\frac{1}{2} \tag{10}$$

Proof complete.

3 Postscript

These calculations were performed with WolframAlpha.

References

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I was finally crazy because of the curse of Riemann.

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