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# Searching for nontrivial zeros in finite field carrying geometric metric ratios

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**Abstract:** With much emphasis on how to solve one of the toughest mathematical problems in field of prime number theory. There is a need to find a good coherent solution that gives much understanding into how to better unravel and solve the Riemann Hypothesis in the best way.

**Keywords:** Riemann Hypothesis – Golden Ratio

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The Riemann[1] hypothesis is one of the mathematical enigmas that have transcend through centuries and it is imperative that we have a solution to such unsolved mathematical hypothesis.

| $\zeta$ | $0$ | $1$ | $i$ | $j$ | $k$ | $\langle . \rangle$ | $0$ |
|---|---|---|---|---|---|---|---|
| | $\lambda$ | $0$ | $\lambda$ | $\lambda i$ | $\lambda j$ | $\lambda k$ | $\langle \lambda. \ , \rangle$ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | $\langle \lambda. 0 \rangle$ | |
| | | | | | | | |
| | | | | | $\langle \lambda. , \ldots \rangle^2$ | | |
| | | | | | | | |
| | | | | $\langle \lambda. k \rangle$ | | | |
| | | | | | | | |
| | | | $\langle \lambda. j \rangle$ | | | | |
| | | | | | | | |
| | | $\langle \lambda. i \rangle$ | | | | | |
| | | | | | | | |
| | $\langle \lambda. 1 \rangle$ | | | | | | |
| | | | | | | | |
| $\langle \lambda. 0 \rangle$ | | | | | | | |

Graphical representation of showing the solutions through of the Riemann hypothesis using the eigenvalue multiplication on the quaternion numbers $i, j, k$ with zeta function $\zeta$, where $\lambda$ represents. eigenvalue.

Here, to bring to you the simple solution to the Riemann hypothesis with this formula:

$$\zeta(s) \rightarrow \lambda(e^{-\#}) = 0$$

***Proposition***: According to David Hilbert and George Polya, they assert that based on the operator theory that: for a defined solution of the Riemann hypothesis, it must be based on a eigenfunction onto a finite field [1] [2] [5] [6].

*So, from this proposition, we can infer that the formula above satisfies the proposition.*

[1]Riemenn hypothesis is unsolved problem among 7 problems of mathematic which were cited by CMI or Clay Mathematic Institute.

The "#" which is taken as the "finite field", equipped with a Hamiltonian quaternion $(1, i, j, k)$, then, the eigenvalue $\lambda$ is the function that mapped onto the "$finite\ field$ (#)" is negative Euler constant $(e)$.[2]

Looking at the table above which started at "0" and ended at "0", with a Hilbert space "$\langle . \rangle$ " at the 6th-row of the eigenvalue table. Was because of "$deliberately\ multiplying$" the eigenvalue $\lambda$ against the Hamiltonian quarternions and the Hilbert space (i.e., a number system that extends complex numbers).

From the table, if one checks closely, they would realize a deliberate spacing (gaps) between the values multiplied back, by the Hilbert space occupied with the eigenvalue with an ellipsis showing "$continuum$".

Now, to fully unbox the mathematical logic behind the new filled Hilbert spaces values. Let's try them out by multiplication by symmetry. Before that, the rows supposedly should have been "8 $rows$", we intentionally avoided that. Because the second part was done at the "$eighth\ row$". So, the table will be "assumed as being "7 $rows$".

So, applying the symmetrical multiplication of the Hilbert space eigenvalues will be:

$$\langle \lambda\, .0 \rangle$$

$$\Longrightarrow \lambda \times 0 = 0 \times \lambda$$

$$\Longrightarrow 0 = 0 \qquad (1)$$

$$\langle \lambda . , . . \rangle^2$$

$$\Longrightarrow < \lambda \times \infty \qquad (2)$$

[1]The negative " $-$ " on the finite field makes its "$finite$" So, it means, any number whether prime numbers or negative even integers that occupies the space of the "$finite\ field$ (#)" is all-negative. Which recedes to zeros.

$$\lambda \times \lambda \times \infty \times \infty = \infty \times \infty \times \lambda \times \lambda$$

$$\Rightarrow \frac{\infty}{\infty} = \frac{\infty}{\infty}$$

$$\Rightarrow 1 = 1 \qquad 3$$

$$\lambda \times k = k \times \lambda$$

$$\Rightarrow \frac{\lambda k}{\lambda k} = \frac{k\lambda}{k\lambda}$$

$$\Rightarrow 1 = 1 \qquad 4$$

$$\lambda \times j = j \times \lambda$$

$$\Rightarrow \frac{\lambda j}{\lambda j} = \frac{k\lambda}{k\lambda}$$

$$\Rightarrow 1 = 1 \qquad 5$$

$$\lambda \times i = i \times \lambda$$

$$\Rightarrow \frac{\lambda i}{\lambda i} = \frac{i\lambda}{i\lambda}$$

$$\Rightarrow 1 = 1 \qquad 6$$

$$\lambda \times 1 = 1 \times \lambda$$

$$\Rightarrow \frac{\lambda 1}{\lambda 1} = \frac{1\lambda}{1\lambda}$$

$$\Rightarrow 1 = 1 \qquad 7$$

$$\lambda \times 0 = 0 \times \lambda$$

$$\Rightarrow \frac{\lambda 0}{\lambda 0} = \frac{0\lambda}{0\lambda}$$

$$\Rightarrow 0 = 0 \qquad 8$$

You take the results of the Hilbert space which:

$$(0,1,1,1,1,1,0) \Rightarrow (0,1,i,j,k,0)$$

Which implies the "7 *rows*" of the eigenvalue multiplication equipped in the "*finite field*" which represents the table that is taken as "#".

Now, to further explain this, let's try out the factorial of this Eigen numbers:

$$(0,1,1,1,11,0)$$

Whether it will give us "7" Which is:

$$0! + 1! + 1! + 1! + 1! + 1! + 0! = 7$$

So, these numbers are equivalent to the "7 *rows*" of the eigen numbers!

So, in the Beurling zeta-function proposition (circa. 1955) about Riemann hypothesis which states that the zeta-function has no zeros at the real dense in,

. $L^{P(0,1)} \leq 7^{P(0111110)}$ > iff the function space is dense in L

But:

Taking it this way, becomes:

Let's make 7 *implied an* "*upward dense space*". While *L* is taken as the "*lower dense space*" So that the statement "*dense*" can have a proper mathematical definition which is taken as: geometric identity–inequality.

That's:

$$7^{p(0,1,1,1,1,10)} = (0,1,i,j,k,0) \geq L^{p(0,1)\text{NOTE}}$$

NOTE The complex numbers ($Hamiltoniian\, numbers * quarternions * excluding\, the\, real\, number$ "1") which is $(i, j, k)$ can/could be taken as either prime numbers or any of the negative even integers.

So, Beurling's proposition is better satisfied for this expression.

Since we now know the eigenvalues (numbers), we can go ahead compute on the exponent decreasing finite field "#". To check whether " 7 $rows$" of the eigenvalues would yield "0" as follows:

$$e - \# \ = \ e - 0111110 \ = \ 0$$

$or,$

$$e - \# \ = \ e - 7! \ = \ 0$$

But,

$$e\# \ = \ e011110 \ \neq \ 0$$

But equals to infinity ($\infty$).

$$e\# \ = \ e7! \ \neq \ 0$$

But equals to infinity ($\infty$).

Going back to the initial equation posted above. The Riemann hypothesis is true. Which is:

$$\zeta(s) \ \longrightarrow \ 7p \ \geq \ L^{p(e-0111110)} \ = \ 0$$

The eigen operator "$\lambda$" was replaced by "$7^p \ \geq \ L^p$".

Now, to prove that the result is right, this can also lead to a new approximate value of Golden ratio (1.6181131101). By the eigenvalue (0111110) in logarithm form as follows:

$$\frac{\log(0111110)}{\frac{\pi + 3}{250}} = \frac{5.045753148}{\frac{\pi + 3}{250}}$$

$$\Longrightarrow \phi = 1.6181131101(Golden\ ratio\ of\ the\ finite\ field)$$

From this prove, it means that, the result satisfies all the hypothesis parameters. Because it was able to explain that the " finite field solution " on which George Polya and David Hilbert proposed in solving the Riemann hypothesis based on an eigenfunction is true. Since, the result was "mathematically sufficient " to help deduced that, the finite field "#" has a metric (distance) that is approximately equal to the Golden ratio.

This is how the proof derived the fine structure constant:

$$\frac{2\#}{the\ Golden\ length} = \frac{1}{2 \times 0111110} \Big/ \frac{1.6181131101}{1000}$$

$$= \frac{1}{137.3327974} \cong 1/137$$

So, in conclusion, in accordance with the result, the Riemann hypothesis has its solution in a "finite field" where the nontrivial 0 is greater than all the elements bounded in the finite field which is approximately proportional to the Golden ratio (which can be called the "Golden metric ratio of the finite field") [3] [4].

$$\zeta(s) = 0 \geq \# \approx \Phi$$

$$i.e., 0 \geq 0111110 \approx 1.6181131101$$

Finally, the result shows that The Golden metric ratio (1.6181131101) determines the magnitude of dimensions of zeros that lies in the finite field where finite field # represent the graphical table. So, the more the prime numbers and negative even-integers spreads across the finite field #, the more there is a dimensional dip on the surface of the finite field where the zeros lie in or bounded with a Golden metric ratio.

Thus, to discover the Golden metric ratio: 1.6181131101. So, with this Golden metric ratio, one can easily spot where the zeta zeros lie in the finite field and with a signature number system of: 0111110, which is also discovered while proofing the Riemann hypothesis.

So, the Riemann hypothesis proof is based on a finite field #, whose zeros converges at a vertical line, with a Golden metric ratio value of 1.6181131101 and a signature number system or serial number of:

$$0111110\ or\ 0,1i,j,k,0$$

Signature number system of: 0111110 and Serial number of: $0,1, I, j, k, 0$.

Hence, all nontrivial zeros lie in finite field # not on critical line $\left(\frac{1}{2}, 0\right)$.

The solution lies at the vertical line of the finite field, not the critical line of the finite field but there is infinite vertical line besides critical line in finite field, but infinite lines carry an inherent geometric metric ratio (Golden metric ratio) where the chances of finding the zeros is bounded.

Which is against the Riemann's statement.

That is, according to the deductions from the proof, in the Feynman path integral, the Riemann Hypothesis relates to the path which generates an infinite number of prime numbers. The implications we be so numerous. That is, at every point in time a particle travels (or transverses) through the Feynman path–there are Riemannian coupling that generates the path. This "path" is where we can easily spot the prime numbers that made up the Riemann Hypothesis. The path has a golden length of "1.6181131101" which generates a new standardized value of the Fine Structure Constant (1/137).

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