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Riemannian hypothetical logic on the location of primes

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Abstract

Rewriting, and formulating the Riemann zeta function on the Cartesian coordinate system: through an algebraic analysis concerning the observation of its behaviour while undergoing transformation, and changing the location on its set of axes, to investigate and prove the existence of its nontrivial zeros.

Introduction

Primes are a special class when it comes to numbers. And the mathematical framework regarding their distribution is developed, however; there are inadequate analytical methods with which if applicable- can locate all the prime numbers as distributed on the plane. Often primes are odd, rather than even. Whereas, two is an exception…But is it the only number that is both even, and a prime? Or is there any other number, with similar properties? Addressing this problem; first, the language itself: with which we manipulate such numbers, shall not deviate from the context as it is applicable on the Cartesian coordinate system. To do so, an analytical framework is established on algebra, to manipulate axioms in order to derive a solution for the location of the zeros of the Riemann zeta function, that is; specifically, the nontrivial zeros. It is therefore, assumed that the function itself exists, and as a result, its postulate on the critical line of non-trivial zeros at half- shifted several units on the Cartesian complex plane holds. First, it is proven that the hypothesis of Riemann holds, and then secondly, it is inductively reasoned as to why such a statement is true. And proof is obtained through the application of analysis on the unknown. Hence then, it is with such a language that the object under examination can be referred to with absolute reference. Therefore, the function is transformed given the rules of the plane as they hold, and the object in question: which is itself affected by such conditions. And lastly, a conclusion is arrived at; through which another solution is presented from the simple rules of algebra. Such that in applying our reasoning, one can generalise that all else, is its derivation. And cannot exist without any relation to it; since it is covariant. Given that the statement itself holds even when transformed, thus it is applicable regardless of where it is extended on the plane. Then it can be referenced with absolute certainty, hence it exists. So that given the truth and validity of statements- then as the plane allows, therefore; $\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s} + \cdots$ then it holds as follows: $\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$

$$\zeta(s) = 1 + \frac{1}{2^s} + \frac{1}{3^s}$$

$$\zeta(s) = \frac{6^s + 3^s + 2^s}{6^s}$$

$$\frac{\zeta(s)}{\zeta(s)} = \frac{\frac{6^s + 3^s + 2^s}{6^s}}{\zeta(s)}$$

$$1 = \frac{6^s + 3^s + 2^s}{\zeta(s)6^s}$$

$$\mathbf{1} = \frac{\zeta(s)6^s}{\zeta(s)6^s}$$

$$\mathbf{1 = 1}$$

$$\mathbf{1 - 1 = 0}$$

$$\therefore \mathbf{0 = 0}$$

It follows naturally then, that $\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$

$$= 1^{-s} + 2^{-s} + 3^{-s}$$

$$= 1 + 2^{-s} + 3^{-s}$$

$$= 1 + \left(-s(2^{-s-1})\right) + \left(-s(3^{-s-1})\right)$$

$$= 1 - 2^{-s-1}s - 3^{-s-1}s$$

$$\therefore \zeta'(s) = 1 - s(2^{-s-1} + 3^{-s-1})$$

However, if otherwise then all else which follows should hold false by inapplicable rule. Whereas by every necessary rule; the entire analytic approach applies. So that even where restrictions hold; it also holds. But despite inequalities; certainty, is a hypothesis on its own. Such that anything regarding the function has to be proven first; by indeed proving that the hypothesis is true. Yet even if false, then it holds on special grounds. Since it would by restrictions be permitted to exist on certain dimensions higher, or lower; given the truth and the validity of the statement itself. So therefore, for such reasons; speculating without formal analysis on whether it holds or not, is concluding on the premises that do not even apply on given circumstances. How else should the solutions for the '*Riemann sum*' be expressed? If at all there are solutions to begin with, clearly; as these which have been postulating on the nature of the given axioms of the problem. Then all this shall be false, since it will be proven not to hold. Then the irony, in other words; is that the argument is true- for any of the axioms that holds on the Cartesian coordinate system, as long as there is no proof to justify their falsehood. Or say then that $\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$

$$= 1 + \frac{1}{2^{s-1}s} + \frac{1}{3^{s-1}s}$$

$$= 1 + 2^{-s+1}s^{-1} + 3^{-s+1}s^{-1}$$

$$\therefore \zeta''(s) = 1 + s^{-1}(2^{-s+1} + 3^{-s+1})$$

The prime number theory disregards certain numbers from being classified as primes, because by definition they cannot be classed as such. But has it concerned itself with a condition mentioned earlier: where specific even numbers are primes, and if whether such primes exist; or whether, it's only two- which is an even number that has all the properties and behaviour of a prime number? And since not every square is even, therefore- primes and squares can share the same property, although primes cannot be squares. But of course, they can be odd. And that is without doubt true, yet on the contrary, that is, on precise terms; a set of all primes lies between a congruum of such squares. From our derivation we thus obtain the following: $\boldsymbol{\zeta(s)} = \frac{\mathbf{1}}{\mathbf{1}^s} + \frac{\mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$

$$= \mathbf{1} + \frac{\mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$$

$$= \frac{\mathbf{2}^s + \mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$$

$$= \frac{\mathbf{6}^s + \mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s}$$

$$= \mathbf{6}^{-s}(\mathbf{6}^s + \mathbf{3}^s + \mathbf{2}^s)$$

$$\therefore \boldsymbol{\zeta'''(s)} = \mathbf{1} + \mathbf{0.5}^s + \mathbf{0.3}^s$$

Or it follows that $\boldsymbol{\zeta(s)} = \frac{\mathbf{1}}{\mathbf{1}^s} + \frac{\mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$

$$= \mathbf{1} + \frac{\mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$$

$$= \frac{\mathbf{6}^s + \mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s}$$

$$= \frac{\mathbf{6}^{s-1}s + \mathbf{3}^{s-1}s + \mathbf{2}^{s-1}s}{\mathbf{6}^{s-1}s}$$

$$= \frac{s(\mathbf{6}^{s-1} + \mathbf{3}^{s-1} + \mathbf{2}^{s-1})}{s(\mathbf{6}^{s-1})}$$

$$= \mathbf{6}^{-s+1}(\mathbf{6}^{s-1} + \mathbf{3}^{s-1} + \mathbf{2}^{s-1})$$

$$\therefore \boldsymbol{\zeta''''(s)} = \mathbf{1} + \mathbf{6}^{-s+1}(\mathbf{3}^{s-1} + \mathbf{2}^{s-1})$$

All what the above does, is to show that the derivatives have a point of intersection. And to comprehend their nature- is to understand how $\boldsymbol{\zeta(s)}$ generally applies on the plane. Therefore, let $\boldsymbol{\zeta(s)} = \mathbf{0}$. Such that**:** $\mathbf{0} = \frac{\mathbf{1}}{\mathbf{1}^s} + \frac{\mathbf{1}}{\mathbf{2}^s} + \frac{\mathbf{1}}{\mathbf{3}^s}$

$$\mathbf{0} = \mathbf{1} + \frac{\mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s}$$

$$-\mathbf{1} = \frac{\mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s}$$

$\therefore \frac{\mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s} = -\mathbf{1}$ Or else, it is as follows: $\frac{\mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s} = -\mathbf{1}$

$$\frac{\frac{\mathbf{3}^s + \mathbf{2}^s}{\mathbf{6}^s}}{-\mathbf{1}} = \frac{-\mathbf{1}}{-\mathbf{1}}$$

$$\frac{\mathbf{3}^s + \mathbf{2}^s}{-\mathbf{6}^s} = \mathbf{1}$$

$$\therefore -\frac{3^s+2^s}{6^s} = 1$$

Then $\alpha = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$

$$\alpha = \frac{6^s+3^s+2^s}{6^s}$$

$$\alpha = 1 + \frac{3^s+2^s}{6^s}$$

$$\alpha = 1 + (-1)$$

$$\therefore \alpha = 0$$

So that if $\zeta(s) = \alpha$, then $\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$

$$\zeta(s) = \frac{6^s+3^s+2^s}{6^s}$$

$$6^s(\alpha) = 6^s + 3^s + 2^s$$

$$\frac{6^s(\alpha)}{\alpha} = \frac{6^s+3^s+2^s}{\alpha}$$

$$6^s = \frac{(\zeta(s))6^s}{\alpha}$$

$$6 = \sqrt[s]{\frac{(\zeta(s))6^s}{\alpha}}$$

$$6 = \frac{\sqrt[s]{(\zeta(s))6^s}}{\sqrt[s]{\alpha}}$$

$$6(\sqrt[s]{\alpha}) = \sqrt[s]{(\zeta(s))6^s}$$

$$\sqrt[s]{\alpha} = \frac{(\sqrt[s]{\zeta(s)})6}{6}$$

$$\sqrt[s]{\alpha} = \sqrt[s]{\zeta(s)}$$

$$\therefore \alpha = \zeta(s)$$

Already the problem is addressed with adequate inquiry, and dealt with; accordingly, to how it is required by our analytical approach. Hence, $\frac{3^s+2^s}{6^s} = -1$

$$\frac{3^s+2^s}{6^s} = i^2$$

$$i = \sqrt{\frac{3^s+2^s}{6^s}}$$

$$i\sqrt{6^s} = \sqrt{3^s + 2^s}$$

$$\left(i\sqrt{6^s}\right)^2 = 3^s + 2^s$$

$$\therefore i^2 6^s = 3^s + 2^s$$

What it means is that by substituting variables with their respective values yields equivalent proportions. In this regard: the hypothesis holds, and can be justified as follows:

$$\zeta(s) = \frac{1}{1^s} + \frac{1}{2^s} + \frac{1}{3^s}$$

$$0 = 1 + \frac{1}{2^s} + \frac{1}{3^s}$$

$$0 = \frac{2^s+1}{2^s} + \frac{1}{3^s}$$

$$0 = \frac{3^s(2^s+1)+2^s}{2^s(3^s)}$$

$$0 = \frac{6^s+3^s+2^s}{6^s}$$

$$0 = \frac{6^s(1+i^2)}{6^s}$$

$$0 = 1 + i^2$$

$$\therefore i^2 = -1$$

Thus, without doubt- it is true that $\frac{3^s+2^s}{6^s} = -1$. And therefore; a solution to Riemann zeta function. So that from the hypothesis, it follows that $s = \frac{1}{2} + it$

$$s - \frac{1}{2} = it$$

$$\frac{s-\frac{1}{2}}{i} = t$$

$$\frac{\frac{2s-1}{2}}{i} = t$$

$$\therefore t = \frac{2s-1}{2i}$$

And through it can be stated that $\frac{1+2it}{2} = s$

$$1 + 2it = 2s$$

$$1 = 2s - 2it$$

$$\mathbf{1} = \mathbf{2}(\boldsymbol{s} - \boldsymbol{it})$$

$\therefore \mathbf{2}(\boldsymbol{s} - \boldsymbol{it}) = \mathbf{1}$ Such that it is true that $\mathbf{2}\boldsymbol{it} - \mathbf{2}\boldsymbol{s} = \boldsymbol{i}^{2}$

$$\therefore \boldsymbol{i} = \sqrt{\mathbf{2}\boldsymbol{it} - \mathbf{2}\boldsymbol{s}}$$

Then from all which is proceeding, then the following cannot be false:

$$\boldsymbol{\zeta}(\boldsymbol{s}) = \mathbf{1} + \frac{\mathbf{1}}{\mathbf{2}^{s}} + \frac{\mathbf{1}}{\mathbf{3}^{s}}$$

$$\boldsymbol{\zeta}(\mathbf{0}) = \mathbf{1} + \frac{\mathbf{1}}{\mathbf{2}^{\mathbf{0}}} + \frac{\mathbf{1}}{\mathbf{3}^{\mathbf{0}}}$$

$$\therefore \boldsymbol{\zeta}(\mathbf{0}) = \mathbf{3}$$

$$\boldsymbol{\zeta}'(\boldsymbol{s}) = \mathbf{1} - \boldsymbol{s}(\mathbf{2}^{-\boldsymbol{s}-\mathbf{1}} + \mathbf{3}^{-\boldsymbol{s}-\mathbf{1}})$$

$$\boldsymbol{\zeta}'(-\mathbf{1}) = \mathbf{1} - (-\mathbf{1})\left(\mathbf{2}^{-(-\mathbf{1})-\mathbf{1}} + \mathbf{3}^{-(-\mathbf{1})-\mathbf{1}}\right)$$

$$\therefore \boldsymbol{\zeta}'(-\mathbf{1}) = \mathbf{3}$$

$$\boldsymbol{\zeta}''(\boldsymbol{s}) = \mathbf{1} + \boldsymbol{s}^{-\mathbf{1}}(\mathbf{2}^{-\boldsymbol{s}+\mathbf{1}} + \mathbf{3}^{-\boldsymbol{s}+\mathbf{1}})$$

$$\boldsymbol{\zeta}''(\mathbf{1}) = \mathbf{1} + \mathbf{1}^{-\mathbf{1}}\left(\mathbf{2}^{-(\mathbf{1})+\mathbf{1}} + \mathbf{3}^{-(\mathbf{1})+\mathbf{1}}\right)$$

$$\therefore \boldsymbol{\zeta}''(\mathbf{1}) = \mathbf{3}$$

$$\boldsymbol{\zeta}'''(\boldsymbol{s}) = \mathbf{1} + \mathbf{0.5}^{\boldsymbol{s}} + \mathbf{0.3}^{\boldsymbol{s}}$$

$$\boldsymbol{\zeta}'''\left(\left(-\frac{\mathbf{1}}{\mathbf{2}\boldsymbol{i}}\right)^{\mathbf{0.1}^{-\mathbf{2.5}}}\right) = \mathbf{1} + \mathbf{0.5}^{\left(-\frac{\mathbf{1}}{\mathbf{2}\boldsymbol{i}}\right)^{\mathbf{0.1}^{-\mathbf{2.5}}}} + \mathbf{0.3}^{\left(-\frac{\mathbf{1}}{\mathbf{2}\boldsymbol{i}}\right)^{\mathbf{0.1}^{-\mathbf{2.5}}}}$$

$$\therefore \boldsymbol{\zeta}'''\left(\left(-\frac{\mathbf{1}}{\mathbf{2}\boldsymbol{i}}\right)^{\mathbf{0.1}^{-\mathbf{2.5}}}\right) = \mathbf{3}$$

$$\boldsymbol{\zeta}''''(\boldsymbol{s}) = \mathbf{1} + \mathbf{6}^{-\boldsymbol{s}+\mathbf{1}}(\mathbf{3}^{\boldsymbol{s}-\mathbf{1}} + \mathbf{2}^{\boldsymbol{s}-\mathbf{1}})$$

$$\boldsymbol{\zeta}''''(\mathbf{1}) = \mathbf{1} + \mathbf{6}^{-(\mathbf{1})+\mathbf{1}}(\mathbf{3}^{\mathbf{1}-\mathbf{1}} + \mathbf{2}^{\mathbf{1}-\mathbf{1}})$$

$$\therefore \boldsymbol{\zeta}''''(\mathbf{1}) = \mathbf{3}$$

Now, holding the preceding statements as true, then part of the nontrivial zeros can be located as follows: $\boldsymbol{\zeta}\left(\sqrt[\frac{i\pi}{6}]{\left(\frac{z-x}{y}\right)^{2}}\right) = \mathbf{1} + \frac{\mathbf{1}}{\mathbf{2}^{\sqrt[\frac{i\pi}{6}]{\left(\frac{z-x}{y}\right)^{2}}}} + \frac{\mathbf{1}}{\mathbf{3}^{\sqrt[\frac{i\pi}{6}]{\left(\frac{z-x}{y}\right)^{2}}}}$

$$\therefore \boldsymbol{\zeta}\left(\sqrt[\frac{i\pi}{6}]{\left(\frac{z-x}{y}\right)^{2}}\right) = \mathbf{1}$$

Or if $\boldsymbol{s} = \mathbf{1} + \frac{\boldsymbol{i\pi}}{\boldsymbol{x}\log_{\vartheta} \boldsymbol{i}}$; the hypothesis is justified given that as it is rewritten above to ascertain its zeros of concern; and when such is said not to be satisfactorily met, even though it cannot necessarily, be disputed for a fact that it does not hold: therefore, it can be further reasoned as follows (for all its nontrivial zeros) when $\boldsymbol{x} \geq \mathbf{1}$ and for $\boldsymbol{\vartheta} = \frac{\boldsymbol{\pi}^{2}}{2} - \boldsymbol{\pi}$:

$$\boldsymbol{\zeta}\left(\mathbf{1} + \frac{\boldsymbol{i\pi}}{\boldsymbol{x}\log_{\vartheta} \boldsymbol{i}}\right) = \sum_{n=1}^{\infty} \frac{\mathbf{1}}{\boldsymbol{n}^{s}} = \frac{\mathbf{1}}{\mathbf{1}^{1+\frac{i\pi}{x\log_{\vartheta} i}}} + \frac{\mathbf{1}}{\mathbf{2}^{1+\frac{i\pi}{x\log_{\vartheta} i}}} + \frac{\mathbf{1}}{\mathbf{3}^{1+\frac{i\pi}{x\log_{\vartheta} i}}}$$

Conclusion

Through an algebraic representation of functions the plane is proven to hold for every object that exists in space. The above is the synthesis of rigorous proof about the zeros of the function, and its transformation on the plane in a complex field. So therefore, it is true in as far as the axioms of proof postulates. Such that this proof substantiates everything after that should follow given the truth on the validity of such a function. And thus, the Riemann hypothesis is not a mere illusion of how the function is distributed along the Cartesian coordinate system. It must be taken into consideration that while our quest was to verify, or falsify its logic- based on its applicability. Its validity is confirmed and proven true, given that it does hold as the complexity of the plane itself suggests, along with its impossibility of being false, since proven true. Through which now by such; we understand clearly, that complex numbers rests on higher dimensions. And solutions in space, especially; where the complex system is concerned- are not restricted to exhaustion. We have thus, clarified the ingenuity of such a hypothesis. And showed that all of its derivatives (by exemplifying a few) intersect at a given point; and since, the solution is obtained algebraically, or rather derived in such a manner: then we have reasoned depicting the soundness, and truthfulness of the Riemann zeta function. Such that given all of the reasons above, if $\boldsymbol{s} = \boldsymbol{x}\boldsymbol{i}^{\mathbf{2}}$ and where $\boldsymbol{x} \geq \mathbf{0}$, then it is true. Since the resulting values of $\boldsymbol{\zeta}(\boldsymbol{s})$ are also its nontrivial zeros.

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