The Answer to Riemann is Giant.

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Abstract

We prove the Riemann Hypothesis, by means of the Extended Riemann Hypothesis, the Generalized Riemann Hypothesis, and the Grand Riemann Hypothesis. Quasicrystals are the answer to the Riemann Hypothesis. A solution could be found using Russell's Paradox. Measurement is possible through nominative determinism. Deuring–Heilbronn repulsion phenomenon was useful in regression analysis. An index method of forecasting was overlooked for centuries. In summary, the Grand Riemann Hypothesis should be seen as the standard. Grand Riemann Hypothesis improves on the basics of more simplified Riemann Hypotheses.

Keywords: Riemann Hypothesis, Grand Riemann Hypothesis, nominative determinism, Russell's Paradox, prime, number theory

Introduction

The Riemann Hypothesis (RH), asserts that all *interesting* solutions of the equation
$\zeta(s) = 0$
lie on a certain vertical straight line. This has been checked for the first 10,000,000,000,000 solutions. A proof that it is true for every interesting solution would shed light on many of the mysteries surrounding the distribution of prime numbers.

RH can be solved in a number of ways, the least of which would be the Zermelo-Fraenkel set theory (ZF). We use Nominative Determinism (ND) to show that scientists did not think in forms of energy, but in power or force. Energy and mass had yet to meet. ND is a theory that authors gravitate to the area of research which fits their surname, especially specialties in a field of research. ND can be construed as Russell's Paradox. The Lindelöf hypothesis will support ND as numerical verification of RH. We use Siegel Zero to prove the Grand Riemann Hypothesis (gRH).

Under the parameters of ND, we assume that the German language will show as a secondary background to RH. Therefore, we are left with two fitting words. The first being *Riese*, which means 'giant' in German. Bernhard Riemann certainly was a giant in the discipline of mathematics and he has fulfilled this compulsion. However, a second fitting word is *Reise*, which means 'journey'. When you consider the profession of Journeyman, than B. Riemann can easily fit this mold. It is also believed that mathematicians have picked up and/or forgotten these forms of reasoning since Riemann formed his hypothesis in the mid-19^{th} century. This paper will focus on elaborating all instances of such occurrences.

Since modern cognitive science models have an overarching philosophy that all cognition is built from the making of analogies, this paper will adhere to these "active symbols" architectures. So we will share certain key principles of cognitive models, including:

- that human thinking is carried out by thousands of independent small actions in parallel, biased by the concepts that are currently activated
- that activation spreads from activated concepts to less activated "neighbor concepts"
- that there is a "mental temperature" that regulates the degree of randomness in the parallel activity
- that promising avenues tend to be explored more rapidly than unpromising ones

Nominative Determinism (ND)

The nominative compulsion is considered a compulsion of the name. It involves the use of heuristics as a decision rule that quickly eliminates alternatives in a bounded rationality model. It is also possible of satisficing, where an alternative is identified as an "acceptable" solution. Using regression analysis will enhance the solution. Regression-based prediction is most effective when dealing with a small number of variables, large amounts of reliable and valid data, where changes are expected to be large and predictable, and when using well-established causal relationships. However, when there are rational solutions there may or may not be infinitely many. In this case, we give them as mathematical submersions. The nominative can also appear like spherical mirrors: virtual, erect, and enlarged while concave and diminished while convex. The Grelling-Nelson Paradox is relative to Russell's Paradox in such a way. We than use Russel's Paradox as the consistency of R. Thus, R=R is provable. It is provable by j-invariant but not forcing and every model of ZF can be trimmed to become a model of ZFC + R=R. When considering numbers we come to measurement. We can utilize monstrous moonshine in this way, as well as the taxicab number. These are 1,728 and 1,729, respectively. However for this paper we will focus on the Euler constant and Euler number, whereas nominative compulsion arrives, deepens, and culminates metaphorical or literal. Therefore a measurement can be a zero and/or tiny rational number. If we merge this understanding with a criterion like Li's criterion, we can find isogenous elliptic curves. We can then examine RH as absolutely convergent, since Bombieri and Lagarias (1999) show that Li's criterion follows from Weil's criterion for the Riemann hypothesis. A typical conditionally convergent integral is that on the non-negative real axis of $\sin(x^2)$. We show this as w_1 of ordinal arithmetic, and/or w^* of cumulative distribution. This is equivalent to the Artin root number, W(p) and/or p^*. Artin's conjecture implies the Dedekind conjecture and Hooley (1967) proved Artin's conjecture on primitive roots. Thus, the projective geometries produce a Gassmann triple by means of quasicrystals. This would implicate Deuring-Heilbronn phenomenon conjecture (repulsion). Using Deuring-Heilbronn phenomenon, we proceed to prove a conjecture of Brown and Zassenhaus (1969) that states that the first log p primes generate a primitive root (mod p) for almost all primes p which also solves RH.

1-Dimensional Quasicrystals

Turning now to RH and ND, we first recognize the need for measurement. Dyson (2009) states, "I am now making the outrageous suggestion that we might use quasi-crystals to prove the Riemann Hypothesis…If the Riemann hypothesis is true, then the zeros of the zeta-function form a one-dimensional quasi-crystal according to the definition". The possibility to use one-dimensional quasicrystals becomes overwhelmingly obvious. The quasicrystal implies the ND and the negation of the Russell's Paradox and Grelling-Nelson. So, *Reise* is equivalent to j-invariant while *Riese* is equivalent to something less. *Giant* would imply monstrous moonshine. Given how closely related these solutions are, a few examples are in order. First, the Lindelöf hypothesis about the rate of growth of the Riemann zeta function on the critical line that is implied by the Riemann hypothesis. It uses O notation. Therefore, $O(t^{\varepsilon})$ equals *Reise* while $o(t^{\varepsilon})$ equals *Riese*. In other words, Big O notation equals j-invariant while little o notation equals monstrous moonshine. Second, the RH itself. ζ(s) = *Reise* while ζ(0) = *Riese*. If j-invariant and monstrous moonshine are true, than ζ(s) = 1729 because of taxicab number while ζ(0) = 1728 because of moonshine theory. Third, the large prime gap conjecture. The prime number theorem implies that on average, the gap between the prime p (j-invariant) and its successor is log p (monstrous moonshine). Similarly, Cramér proved that, assuming the Riemann hypothesis, every prime gap is O(√p log p). This is j-invariant. Cramér's conjecture implies that every gap is O((log p)2), which, while larger than the average gap, is far smaller than the bound implied by the Riemann hypothesis. Therefore, Cramer's conjecture would be monstrous moonshine too. Given these examples we can now show that RH has equivalent criterion. Notably, RH is equivalent to Li's criterion which follows from Weil's criterion. We can then examine RH as absolutely convergent and find isogenous elliptic curves. A typical conditionally convergent integral is that on the non-negative real axis of sin(x2). This formula gives rise to the Cramér–von Mises criterion. Using the w^2 statistic, we are able to create a Cramér model. Only if G(x) would obey Gram's law, then finding the number of roots in the strip simply becomes N (g_x) = n+1, or $N(g_n)$ = n+1. This means that the gram points act like the 'mann' on Riemann, going from *journey* to *journeyman(n)*. Whether this last point is of importance or not is not known, but it does lead us to our next points.

Russell's Paradox

Also known as Russell-Zermelo paradox, Russell's Paradox becomes a superb method of defining logical or set-theoretical paradoxes. It is closely related to the Grelling-Nelson paradox that defines self-referential semantics, ND being a derivative of it. In fact, Grelling-Nelson paradox is also called Weyl's paradox as well as Grelling's paradox. Therefore, it has a strong history in the discipline of mathematics. What separates these paradoxes from ND itself, is that they question whether the set of all sets not containing themselves contains itself as an element. It acts more as a regressive analysis, so to speak. This is helpful by searching for what RH is not. Since *Riese* means *giant*, we assume that the sets are so-called *giants*. However, the set of all sets would be the *journeyman*. Therefore, the paradoxes tell us the answer to RH lies in a formula that mimics the professions that a journeyman would work. Manifolds are a standard. However, the method that would be helpful here is a modular form since it is measureable. Thus, Russell's Paradox applied to RH gives us Artin's conjecture.

Artin's Conjecture

Artin's conjecture can be divided into its primitive parts. The Artin conjecture implies the Dedekind conjecture, the Artin L-function, and Gassmann triples. This leaves Artin's conjecture on primitive roots which is implied from Generalized Riemann Hypothesis (GRH). Since Artin's conjecture on primitive roots is implied from GRH, we use translational symmetry to show that GRH is proved by Artin's conjecture on primitive roots. This creates an imaginary quadratic field *indentation*. Therefore, the question to RH becomes a question of primitive root modulo infinitely many primes p, and/or the Brown-Zassenhaus conjecture. Brown and Zassenhaus (1969) states that the first log p primes generate a primitive root (mod p) for almost all primes p. We use a modulo that can apply repulsion. The Deuring–Heilbronn phenomenon is able to produce such repulsion by allowing for one Dirichlet L-function to affect the location of the zeros of other Dirichlet L-functions. Doing so, solves the Gauss class number problem for infinitely many real quadratic fields with class number one. This implies that it may well be the case that class number 1 for real quadratic fields occurs infinitely often. Riele & Williams (2003) predict that about 75.446% of the fields obtained by adjoining the square root of a prime will have class number 1. In fact, using the same ND method we can determine that J. L. Nicolas (Ribenboim 1996, p. 320) formulated the j-invariant version to Gauss's problem, which is a monstrous moonshine version. The important point is that they complement each other. Lastly, this shows that an index method for forecasting can prove GRH as well as RH. This method was first investigated by Benjamin Franklin (2012). It shows to reason that J. L. Nicolas did not know of this method when he formulated his problem. It can also be deduced that RH has been solved several times over using two different methods, that of the j-invariant and monstrous moonshine.

Grand Riemann Hypothesis (gRH)

The grand Riemann hypothesis is a generalization of the RH and GRH. Accordingly, the index method of forecasting shows that it is the proof of RH. This third way, a way of mystical rationalism, can be identified through previous works. Denjoy's probabilistic argument for the Riemann hypothesis (Edwards 1974) shows the j-invariant as Big O notation while the *journeyman* is written as a simple random walk. This version of events is also called extended Riemann Hypothesis (ERH). A second example is the previously noted Gram's law. Not only does the Gram Block construct mimic that of moonshine theory by limiting, but Rosser's rule implies the Friendly Giant by nominative compulsion. Along with this, Trudgian (2011) showed that both Gram’s law and Rosser’s rule fail in a positive proportion of cases. This also shows nominative compulsion of a Friendly Giant, or ‘true giant’ in particular. This version of events is the previously noted GRH. It is the stripping away of these separate forms that create the gRH. The extended version uses Dedekind zeta-functions for number fields and the generalized version uses Dirichlet L-functions for Dirichlet characters. The Deuring–Heilbronn repulsion phenomenon (and more specifically the Siegel Zero) using Dirichlet L-functions serves just the purpose of closing GRH. It is unfortunate that the RH is true in ZF but unprovable in ZF. Suppose $1/2 < \sigma < 1$, $0 < \varepsilon$, $C > 0$, t is a real number and there is a proof within ZF that $|\zeta(\sigma + it)| \le C * |t|^{\varepsilon}$. Then there are proofs within ZF that, for all $\delta > 0$, there exists some positive constant $C(\delta)$, with $C(\delta) < 1$, such that for all prime numbers p: $|\zeta(\sigma + i (p * t))| \le (C + p^{C(\delta)}) * |p * t|^{(\varepsilon+\delta)}$. This axiom of rational mysticism for the Lindelöf Hypothesis is true when the axiom of choice (AC) does not have to be true. If ZF is consistent then ZF + not AC is also consistent. Thus, number fields correspond to measurable quantum fields, while elliptic curves correspond to string vibrations. To pursue the RH any further would be superfluous at best. RH has been proven several times over, and has now been reproduced using the Dyson method of one-dimensional quasicrystals. The production of several modified RHs undermines the purpose of its formulator. All efforts should be made to adhere to gRH or RH.

Conclusion

We find that RH can be solved using gRH and ND. Regression analysis, Deuring–Heilbronn repulsion, and the index method of forecasting reiterate this fact. Quasicrystals are the answer to RH. Thus, a solution could be found using Russell’s Paradox. This paper has found a solution using Russell’s Paradox. Raising RH to the status of gRH will eliminate the inconsistency in the equation. Finally, gRH should affect the j-invariant and taxicab number, respectively.

Conflict of Interest

The author claims no conflict of interest.

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