Theorem of geometric completeness.

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Abstract

In this extension of our previous discussions, on the limits of measurement, we define the measurement minimums within the Yang-Mills mass gap problem, The Hodge Conjecture, The Riemann Hypothesis, The Poincare Conjecture, The Navier-Stokes Equations, P vs NP, and the Birch Swinnerton-Dyer Conjecture. We introduce a theorem of geometric completeness and the Millennium problems are used as lemmas to support our proof.

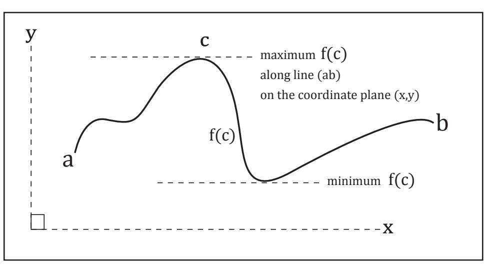
1.0- Introduction

As we have discussed in all of our previous papers, zero and infinity are not measurable. This has the effect of eliminating any smooth approaches to zero for any real number probability bounded by measurement and relative set theory. In this discussion, we establish a minimum measurement for any relative number set, effectively aligning all measurable Riemann non-trivial zeros along the circumference of a circle with a real radius of $\left(r = \frac{1}{2}\right)$ and restricting all Hilbert zero points to the boundaries of a circle. The Clay Mathematics Millennium Problems are used as lemmas to demonstrate that *the minimum real or complex measure in any complete system of geometry is a simple, closed, curve.*

1 .1 A complete system of geometry

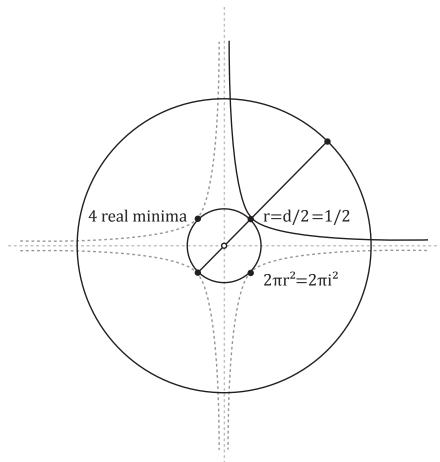
In our last paper , we demonstrated how Fermat's definition of maxima or minima requires a real length with real endpoints *(Figure 1)*.

"$Suppose\ that\ a < c < b. If\ a\ function\ f is\ defined\ on\ the\ interval\ (a, b), and$
$it\ has\ a\ maximum\ or\ minimum\ at\ c, then\ either\ f'\ doesn't\ exist\ at\ c, or\ f(c) = 0$"



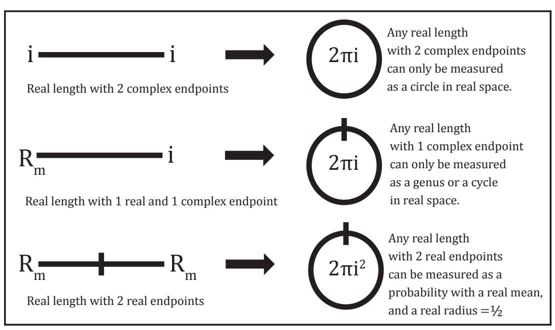
(Figure 1) *Fermat's theorem establishing maxima and minima of functions.*

The premise of this proof is that any complete system of geometry does not include points that are not established by a real length. We demonstrate that any real length, in any complete system of geometry, contains the minimum measurement of($2\pi i$) and must be able to establish a real vertex on a cone to establish a probability for a genus =0 in real space. In our paper on Fermat's theorem, we discussed how projecting Euler's primary identity onto the vertex of a cone could define the limits to the upper half of the coordinate plane. In (Figure 2) we demonstrate how the projection of zeta function limits onto the coordinate plane, oriented on the base of a cone, can establish real minima for the measurement of any genus (or "point") in all quadrants of the coordinate plane.



(Figure 2) *Any complete system of geometry must be able to represent both the vertex of a cone in real space, and a genus one modular form (torus) in the upper half of the coordinate plane. All modular forms and homographic groups, in any complete system of geometry, have a minimum real length* $= 2\pi i$.

The limits of the zeta function are projected in all quadrants to demonstrate the establishment of 4 real minima. Because any diameter contains a real measurable radius, $r = \frac{d}{2}$, the establishment of real minima in all quadrants of the coordinate plane also creates a real radius in all quadrants. Any real length or radius, with either real and complex endpoints, can be held to the minimum measure of a simple closed curve, $(2\pi i)$, in any complete system of geometry *(Figure 3)*.



(Figure 3) *Any real length or radius, with either real and complex endpoints, can be held to the minimum measure of a simple closed curve*

Our resolution of Riemann is accomplished by limiting all non-trivial zeros to a simple closed curve with real part $\frac{1}{2}$. The Clay Mathematics Millennium Problems are used as lemmas to demonstrate the proof of our theorem.

2.0-Theorem of geometric completeness

Theorem:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

We will begin our proof with two definitions:

Complete system of geometry- Any complete system of geometry must be able to satisfy all the requirements of Riemannian geometry as well as clearly defining the boundary between the real and complex planes.

Minimum measurement- Any complete system of geometry is able to be oriented on a coordinate plane and contains the same minimum real lengths required of any modular form, elliptic curve or non-trivial zero.

Lemmas:

2.1 Lemma - The Birch Swinnerton-Dyer Conjecture:

"If the genus of C_0 is greater than or equal to 2, then C_0Q is finite".

***Proof** :*

Every compact connected two-dimensional manifold is homeomorphic to a sphere, the connected sum of tori, or the connected sum of real projective planes.

All genera, real and complex, have the minimum measurement of a simple closed curve $(2\pi i)$.

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.2 Lemma- The Riemann Hypothesis:

"The non-trivial zeros of $\zeta(s)$ have real part equal to $\frac{1}{2}$."

***Proof** :*

The minimum measure for the surface of any complete Riemannian manifold, real or complex, is a curve with real length, imaginary endpoints and a minimum real measure of $\frac{1}{2\pi i}$

Any complete Riemannian geometry has a minimum least-time connected measure of genus=0 (surface of a sphere)

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.3 Lemma -The Poincare conjecture

Thurston resolves Poincare (this was proven by Perelman):

"Every oriented prime closed 3-manifold can be cut along tori, so that the interior of each of the resulting manifolds has a geometric structure with finite volume."

***Proof** :*

-Every real torus is the product of three circles.

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.4 Lemma - The Hodge Conjecture:

"On a projective non-singular algebraic variety over C, any Hodge class is a rational linear combination of classes cl(Z) of algebraic cycles."

Proof *:*

- On any projective non-singular algebraic variety over C, there is a minimum, positive and real, geometric length (basis) defined by complex cycle endpoints.

-any connected and oriented manifold has a minimum measure of 4 real points and two axis of symmetry, one real and the other imaginary (Poincare duality and Abel's Theorem)

-any homology group, with genus greater than zero, is held to the minimum measurement of a circle $(2\pi i)$

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.5 Lemma - The Navier-Stokes equations:

(A) Let u be a weak solution of the Navier–Stokes equations, satisfying suitable growth conditions. Let E be the singular set of u. Then P1(E) = 0. (B) Given a divergence-free vector field u ◦ (x) and a force f(x, t) satisfying (4) and (5), there exists a weak solution of Navier–Stokes (1), (2), (3) satisfying the growth conditions in (A)

(A) Existence and smoothness of Navier–Stokes solutions on R 3 . Take ν > 0 and n = 3. Let u ◦ (x) be any smooth, divergence-free vector field satisfying (4). Take f(x, t) to be identically zero. Then there exist smooth functions p(x, t), ui(x, t) on R 3 × [0,∞) that satisfy (1), (2), (3), (6), (7).

(B) Existence and smoothness of Navier–Stokes solutions in R 3/Z 3 . Take ν > 0 and n = 3. Let u ◦ (x) be any smooth, divergence-free vector field satisfying (8); we take f(x, t) to be identically zero. Then there exist smooth functions p(x, t), ui(x, t) on R 3 × [0,∞) that satisfy (1), (2), (3), (10), (11).

(C) Breakdown of Navier–Stokes solutions on R 3 . Take ν > 0 and n = 3. Then there exist a smooth, divergence-free vector field u ◦ (x) on R 3 and a smooth f(x, t) on R 3 × [0,∞), satisfying (4), (5), for which there exist no solutions (p, u) of (1), (2), (3), (6), (7) on R 3 × [0,∞).

(D) Breakdown of Navier–Stokes Solutions on R 3/Z 3 . Take ν > 0 and n = 3. Then there exist a smooth, divergence-free vector field u ◦ (x) on R 3 and a smooth f(x, t) on R 3 × [0,∞), satisfying (8), (9), for which there exist no solutions (p, u) of (1), (2), (3), (10), (11) on R 3 × [0,∞).

Proof *:*

- All smooth, divergence-free vector fields indicated in the problem are spherically symmetric

- References (1), (2) and (3) are the Euler equations. The Euler primary identity is the minimum measurement in any of the Euler equations and is defined by a simple closed curve

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.6 Lemma - P vs NP:

"$P = NP$ or $P \neq NP$

Proof *:*

-All relative sets of P and NP contain a real part and imaginary part which can only be measured as a sequential cycle or a length without defined endpoints.

-Every P is a sequential cycle and therefore limited to the minimum measurement of a simple closed curve.

All NP have length but no defined endpoints. The maximum length of NP is equal to a complete P. Because NP is always a subset of a complete P, both are limited to the minimum, and maximum, of a simple closed curve

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

2.7 Lemma - The Yang Mills mass gap:

"Prove that for any compact simple gauge group G, a non-trivial quantum Yang–Mills theory exists on $\mathbb{R}^4$ and has a mass gap $\Delta > 0$. Existence includes establishing axiomatic properties at least as strong as those cited in [45, 35]

(Authors note to readers: References[45,35] are from the original problem. Proof of this particular problem requires a reworking of the standard model of physics. Our model is based on the same Nambu-Poisson dynamics that drive Yang-Mills symmetries and boundaries. Any proof we can offer of Yang Mills theory is the eight papers we have written on this subject using Nambu Poisson dynamics and a complete theory of mathematics. We include some illustrations from our paper on the elimination of gluon fields to demonstrate that Yang-Mills symmetries can have axiomatic properties that match all the requirements in the statement of the problem.)

Proof *:*

-Any compact simple gauge group has a minimum vector length with imaginary endpoints

-Any wave based particle has a minimum measure of both frequency and amplitude. Frequency is measured in cycles (Hertz). In addition, the minimum measurement for any electromagnetic point particle is $2\pi i^2$

-All axiomatic properties cited in [45, 35] are spherically symmetric and held to the minimum measurement of "coupling" (from our paper on the elimination of gluon" fields").

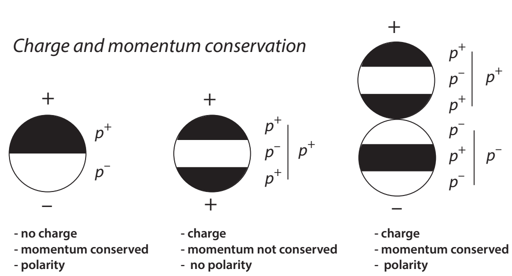
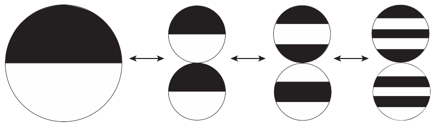


Fig.3` - Polarity, current, spin, angular momentum and Coulomb dynamics must be conserved for all charged particles. Conservation of these Lorentz invariant boundary conditions is accomplished through the coupling of quantum spherical potentials based on Yang-Mills symmetries and Nambu-Poisson Dynamics.



$$-\{\mathcal{H}_{sin}, \mathcal{H}_{cos}, f(t_n)\ \} = \left\{\mathcal{H}_{sin}, \mathcal{H}_{cos}, f(t_{Q_\psi})\right\}$$

Fig.4- Geometric representation of Yang-Mills coupling dynamics

Conclusion:

The minimum real, or complex, measure, in any complete system of geometry, is a simple closed curve.

3.0 - Discussion

The theorem is proven.

References

All references in this paper can be found in problem statements of the Clay Mathematics Millennium problems:

https://www.claymath.org/millennium-problems