An Addendum for Mathematics

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Abstract

This paper is the first in a series titled an Addendum for Mathematics. These papers concern themselves with the clearing up and removal of certain limitations of mathematics, as well as the extension of certain areas which have troubled mathematics back for too long. Unfortunately, the internet architecture of mathematics does not allow for live updates, so this paper shall be spilt into parts and updates, which may become tedious to sift through however the latest version will always contain the mathematics I feel is pertinent, some theorems, ideas and equations may be removed. Not due to being incorrect, as I would simply correct them, but because I no longer feel that they are exceptionally needed for mathematics to continue. It should also be noted that Latex can be a bit tricky and because I do not have time to correct every alignment or spacing issue some things may appear in the incorrect place.

1. *The Square Root of Zero*

This idea was first put forward in my proof of the Riemann Hypothesis, it is an idea necessary for the continuation of mathematics and one that I shall properly lay out here. The first thing to note is that the square root of zero although described originally by me as normally distributed will now be described as the outcome of an Samuels/Ivan Orbit I have not yet decided on the name. Which can be described as a series of cycles and axis. I shall now restate the proof and then go on to describe its properties.

Theorem 1.1. *The square root and by extension the n^{th} root of 0 is by definition uncountable as 0 isn't countable,, but can be represented by as an Ivan Orbit which takers the form of $e^x(cos(\theta) + isin(\theta))$..*

Proof.

$$x = 0^{\frac{1}{2}}$$
$$e^{i\frac{1}{2}ln|0|} = cos(\tfrac{1}{2}ln|0|) + isin(\tfrac{1}{2}ln|0|)$$
$$i\tfrac{1}{2}ln|0| = ln|cos(\tfrac{1}{2}ln|0|) + isin(\tfrac{1}{2}ln|0|))$$
$$\tfrac{1}{2}ln|0| = iln(cos(\tfrac{1}{2}ln|0|) + isin(\tfrac{1}{2}ln|0|))$$
$$0^{\frac{1}{2}} = e^{-iln(cos(\frac{1}{2}ln|0|)+isin(\frac{1}{2}ln|0|))}$$
$$0^{\frac{1}{2}} = e^{iln|u+iv|}$$
$$0^{\frac{1}{2}} = (cos(\theta)) - isin(\theta))e^{arg|\omega|}$$
$$\text{where } \omega = u + iv$$
$$-\pi < arg|\omega| \geq \pi$$

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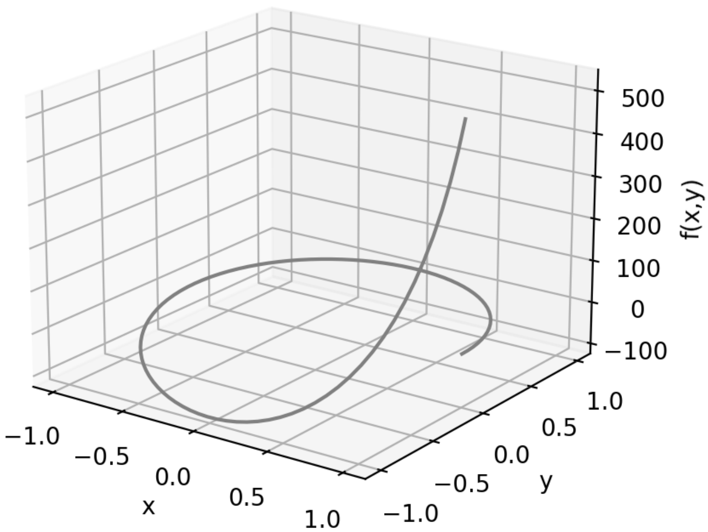

FIGURE 1. *Samuels/Ivan Orbit*

□

The Samuels/Ivan Orbit must be analysed in 2 planes. On the theta plane and on the omega plane.

Better graphs showing the surface and probability distribution shall be provided later. However, for now I shall provide this graph I introduced in the Riemann Hypothesis Proof.

2. *The Logarithm of 0 (Analysis of counting 0)*

Conventionally the function $ln(x)$, $\rightarrow \infty$, as $x \rightarrow 0$.

LEMMA 2.1. *The value of the natural logarithm of 0 is probabilistic/indeterministic.*

Proof. By 1st principles.
$ln(a) = \int_1^a \frac{1}{x} dx$.
Disregarding conventional integral rules for $\frac{1}{x}$. $ln|0| = \left[\frac{x^0}{0}\right]_1^0 = \left[\frac{0^0=1}{0}\right] - \left[\frac{1^0=1}{0}\right]$

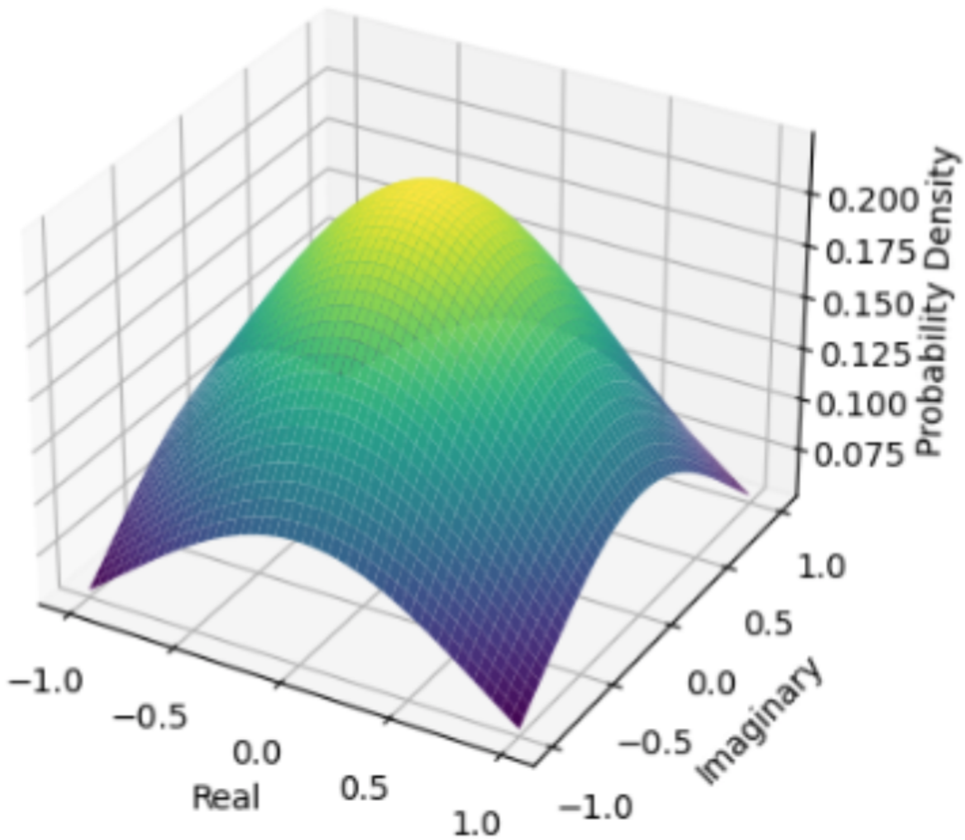

FIGURE 2. *Samuels Orbit 'Probability' Distribution*

Conventional integration would give
$ln|0| = ln|0|$ - $ln|1|$.
The value of $ln|1|$ is 0 and the value of ln0 can be considered to be the y-axis, but before diving into that deeper let us continue our analysis.
Comparing the two results we have.
1) $ln|0| = ln|0|$ - $ln|1|$.
2)$ln|0| = \frac{1}{0}$ - $\frac{1}{0}$
The first thing to note is that dividing by 0 results in different results for the first and second terms.
When an event has different outcomes it is considered to be due to probability.
Therefore we can say that dividing by 0 is a probabilistic operation.
If taking $\frac{1}{0}$ as deterministic singular result than than we only have one outcome 0, given by $ln|1|$.
So we can say $ln|0| = \frac{1}{0} - \frac{1}{0} = 0$.
This can be called counting by symmetry. This symmetry results in an average for the value of $ln|0|$ being calculated, as 0. The shape of the result is starting to form.

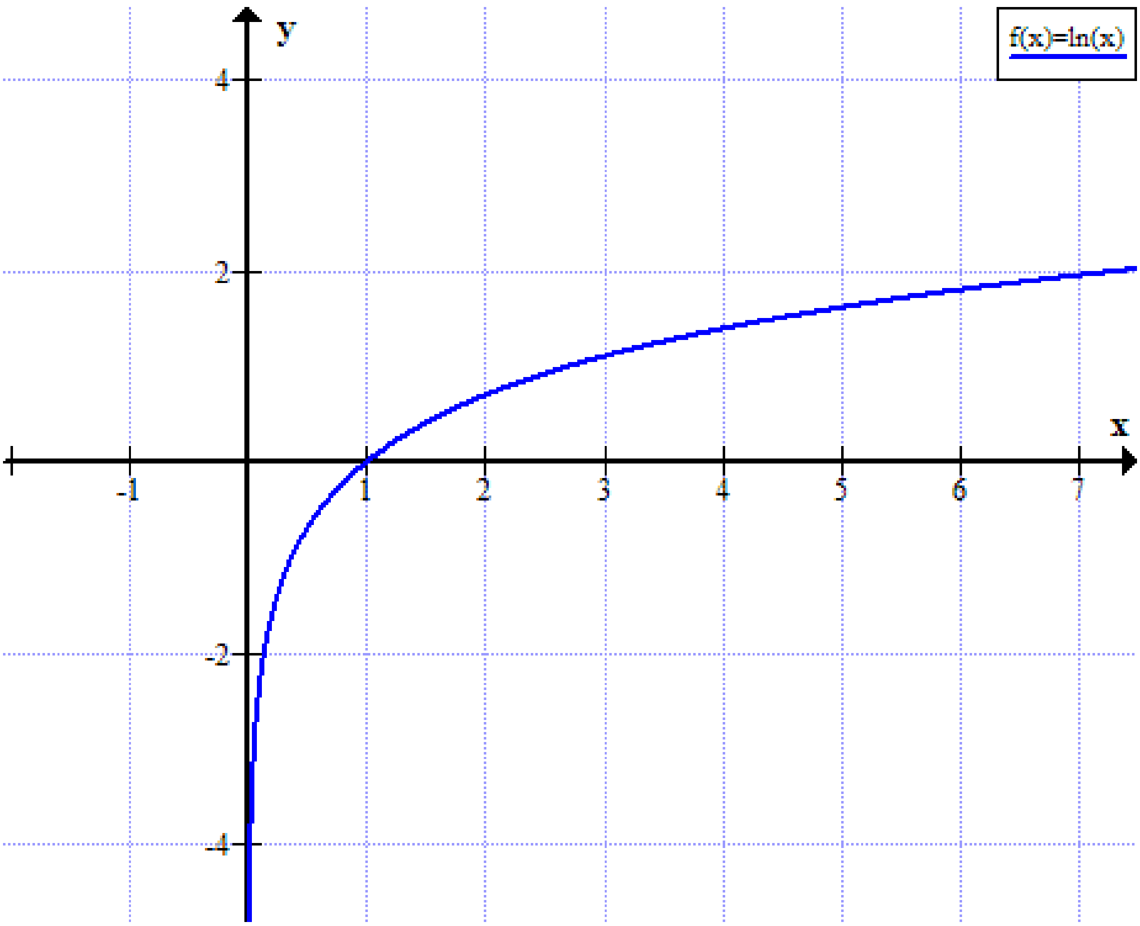

FIGURE 3. *Graph of ln(x) showing the plane change at -∞*

However if we say $\frac{1}{0} = -\infty$. Than we can say.
$ln|0| = -e^{|w|}sin(\theta|cos(\theta)tan(\theta) = -e^{|w|}sin^2(\theta) = -e^{|w|}cos^2(\theta) = -e^{|w|}tan^2(\theta)$.

□

The 'complex' continuation of $ln(0)$ is a key addition to mathematics to allow the solving of equations not possible with conventional mathematics.

As $x \to 0, ln(x) \to \infty$. This asymptote at $-\infty$ is a plane change. This theorem goes for all asymptotes. All asymptotes are changes in plane, as the values become uncountable, [?].

This continuation can be analysed different ways ether through probability or the infinite constant f. As each non integer produces a different complex continuum it can be shown that it is possible to count the different infinities. @$f^{\frac{1}{2}}$, $f^{\frac{1}{3}}$ .... $f^{\frac{1}{\infty}}$ where $f_\infty = f(f^{\frac{1}{n}})$. All infinities are be assigned their own constant based on the plane they are counted on. This leads to operations between the different infinities where they can be resolved onto different planes.

an example of the operations on infinity are.

$$1f^{\frac{1}{2}}x2 = 2f^{\frac{1}{2}}$$
$$1f^{\frac{1}{2}}x1f^{\frac{1}{2}} = 1f^{\frac{1}{6}}.$$

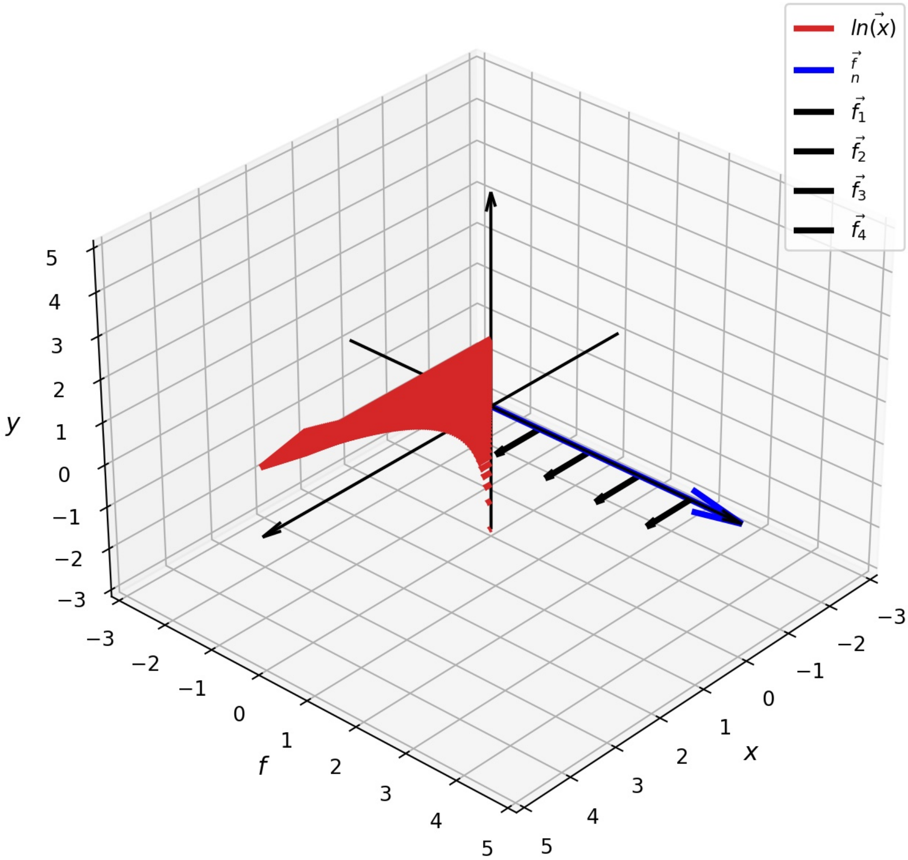

FIGURE 4. *Graph of ln(x)*

3. *A note on* $0 = \infty$

It should be known that the Riemann assumption that $0 = \infty$ is not true. ∞ is more countable than 0

Number	Base 1 Uncountable	Base 1 Untotalable
0	base 1 uncountable	base 1 untotalable
$\frac{1}{2}$	base 1 uncountable	base 1 untotalable
∞	base 1 countable	base 1 untotalable

It can be seen therefore that in countability and totalability $0 = \frac{1}{2}$. However, $\infty = 0 = \frac{1}{2}$ only in totalability.

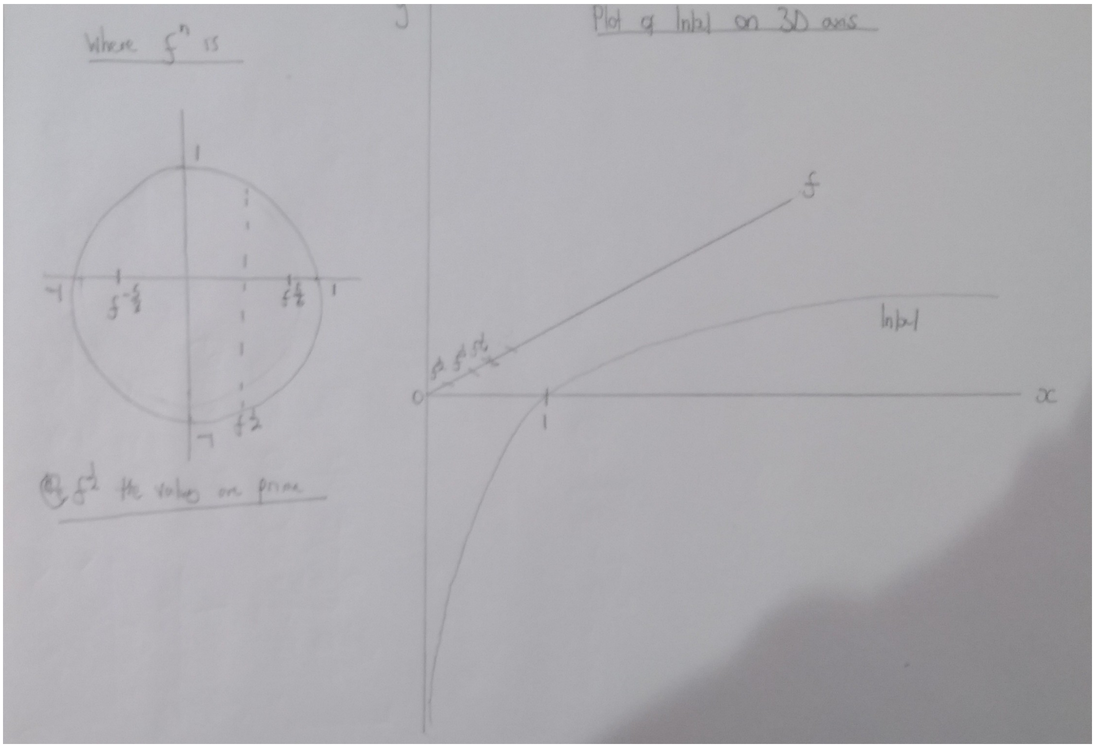

FIGURE 5. *Drawing of Graph of ln(x) including plane change*

4. *The restitution of Binomial and Differential techniques*

The scope of binomial and differential techniques is largely the same, however the techniques can be considered to be different. The binomial expansion is.
$1 + nx + \frac{n}{2!}(n-1)x^2 + \frac{n}{3!}(n-2)(n-1)x^3....etc$
The thing to note is that all binomial expansions begin with 1 as the first term.
Looking at the differential of x^2, followed through and summed., which we shall reefer to for now as $\Lambda(x)$
$\Lambda(x^2) = 1 + 2x + x^2$, which is equivalent to $f(x) + f'(x) + 1$
This is where the problem lies, the Binomial Theorem provides a total of the possible counts of a total or expression. So when differentiating you are provided with an expression of the base count of that expression. However when differentiating across there is a difference of 1. Where you end up with the expression $1 = 2$ similar to the P vs NP problem. So in order to rectify this imbalance we must continue differentiating.
$x^2 + 2x + 2x^0 + 2.0.x^{-1} + 2..0.x^{-2} + ..etc$
The new terms in the sequence can be expressed as $\frac{0}{x} + \frac{0}{x^2} + \frac{0}{x^3} + ..etc$
Which can be thought of to be a converging series converging to $\frac{0}{\infty}$, the result of which is -1. Shown by $\frac{\infty}{0} = 1$ $\frac{0}{\infty} = -1$. This now congresses the expressions.

LEMMA 4.1. *The continued differentiation of an expression past the constant term C i.e Cx^0 results in the restitution of the differential with the binomial expression.*

5. *Series Power Addition*

Series power addition is a method for transforming algebraic expressions. The method is denoted by (x) and is demonstrated as.

$$K(x^n) = \frac{(x+k)^n}{n}$$

The steps are
(1) reduction in power
(2) division by power
(3) add 1 to the numerator
(4) raise the power of the numerator

so for $K(x^2) = \frac{(x+1)^2}{2}\frac{(x+1)^2}{2}$. The practical use of this would be to transform expressions into higher orders without losing the order of the subject.

$$\text{So for } y = x^2.$$
$$K(y) = K(x^2)$$
$$y + 1 = \frac{(x+1)^2}{2}$$
$$y + 1 = \frac{x^2+2x+1}{2}$$
$$y = \frac{x^2+2x+1}{2} - 1$$
$$y = \frac{x^2}{2} + x - \frac{1}{2}$$

So we have transformed y so that it now includes an x term. This can be continually applied to target the coefficient.

$$K(y+1) = K(\frac{(x+1)^2}{2})$$
$$(y+2) - \frac{(x+2)^2}{4}$$
$$y = \frac{x^2+4x+4}{4} - 2$$
$$y = \frac{x^2}{4} + x - 1$$

6. *Proof of value for e^{-x^2}*

$$\int e^{-x^2} dx$$
$$e^{(ix)^2} dx = \int (cos(x) + isin(x))^2 dx$$
$$cos^2(x) - 2icos(x)sin(x) - sin^2(x)dx$$
$$\int e^{-x^2} = sin(2x)$$
$$\text{Therefore } \int e^{-x^2} = sin(2x) = 2.$$

7. *πDistribution*

The equivalent form of the Gaussian Distribution in π form is.

$$\pi(s) = \pi^{\frac{ln|\frac{\frac{s}{\sigma}+2ln|\sigma|}{s\pi}}{ln|\pi|}}$$

7.1. *Changes in Standard Deviation*

$\int_0^{2\pi}\int_{\sigma_1}^{\sigma_2} \sigma d\sigma d\theta = 1$
$[\sigma_f^2 - \sigma_i^2] = 1$
$\frac{1}{\pi} = \sigma_f^2 - \sigma_i^2$
The standard deviation in a π distribution is allowed to fluctuate by as much as $\frac{1}{\pi}$ without there being a change of plane. In a normal distribution the standard deviation may fluctuate by as much as $\frac{2}{\pi}$.