THE IMAGINARY NORM

PART I

The Introduction of Norms

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§ ABSTRACT

It is known that the direction of a position vectors located along the imaginary dimension of the Euler coordinate system distorts the symmetry of the Euler cycle. The pertinent Literature in context has algebraic origins but yet can be argued as has been done by others in the past that – the direction of the singularities cannot be real and therefore must carry an imaginary component. To understand how Norms oscillate, we propose the "Norm Wave Function" whose exposition we give herein is based on the geometric expansion of Norms. The once speculative Mohammed Abubakr- proposition on Calpanic Numbers, can now find full justification as a fully-fledged proposition. At the end of it all our contribution in the present work – if any; is that we shall here in Part One demonstrate that directional singularities that distorts Euler rotations are imaginary state vectors that are cyclic in nature and in Part two of this proposition we will further demonstrate that the hypothetical Norm in proposal carry unique attributes that may have the potential to explain the manifestation of real space from the imaginary realm.

§ Key Words

Norm, Norm Wave Function, Directional Singularity, Calpanic Numbers.

§ INTRODUCTION

We shall here discuss the exactitude which lurks in the direction of position vector $\vec{\emptyset} = (0 \quad 0)$. Its direction in Euler Coordinates is undefined however, according to the Theory of Special Relativity, $\frac{0}{0}$ must be equal to one[1]. The result must be conceived else we must abandon the Theory of Special Relativity as refuted (Barukcic, 2016). Writing in his book "*Cosmos Redefined Witness the Revolution*", (Abubakr, 2008) Mohammed Abubakr revived the almost abandoned line of thought which most view as a pseudo-math because he attempts to assign a Calpanic Number[2] to a Norm using a similar approach adopted for the creation of imaginary numbers. However, this line of thought cannot be abandoned because he is basing his argument on fundamental principles of imaginary numbers. Calpanic numbers neither represent mathematics or logic but rather the intuitive power of human reason and imagination. The only limitation of

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[1] Direction of vector $\vec{\emptyset} = (0 \quad 0)$

[2] $\hat{\omega} = Z_0 + Z_1 \varsigma$ where $\vec{\varsigma} = (0 \quad 1)$

position vector $\vec{\varsigma}$ is that it does not oscillate under geometric expansion[3] therefore $\tilde{\mho}$ may not be conceived as a periodic function i.e.

$$e^{\varsigma Ø} = \begin{pmatrix}0\\1\end{pmatrix}^0 + \begin{pmatrix}0\\1\end{pmatrix}^1 \frac{Ø^1}{1!} + \begin{pmatrix}0\\1\end{pmatrix}^2 \frac{Ø^2}{2!} + \begin{pmatrix}0\\1\end{pmatrix}^3 \frac{Ø^3}{3!} + \begin{pmatrix}0\\1\end{pmatrix}^4 \frac{Ø^4}{4!} + \begin{pmatrix}0\\1\end{pmatrix}^5 \frac{Ø^5}{5!} ..$$

$$e^{\varsigma Ø} = \begin{pmatrix}0^0\\1^0\end{pmatrix} + \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^1}{1!} + \frac{Ø^2}{2!} + \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^3}{3!} + \frac{Ø^4}{4!} + \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^5}{5!} ..$$

$$\text{Re } e^{\varsigma Ø} = \begin{pmatrix}0^0\\1\end{pmatrix} + \frac{Ø^2}{2!} + \frac{Ø^4}{4!} + \frac{Ø^6}{6!} .. \qquad [1]$$

$$\text{Cal } e^{\varsigma Ø} = \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^1}{1!} + \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^3}{3!} + \begin{pmatrix}0\\1\end{pmatrix} \frac{Ø^5}{5!} + \cdots .. \qquad [2]$$

In [1] the first term of the geometric expansion $\begin{pmatrix}0^0\\1\end{pmatrix}$ has the component 0^0 a fallacy with algebraic origins. In Combinatorics the exponent is defined and also there is sizable proof[4] existing in (Weisstein, 2008) that proves $0^0 = 1$ therefore [1] can be expressed as,

$$\text{Re } e^{\varsigma Ø} = \begin{pmatrix}1\\1\end{pmatrix} + \frac{Ø^2}{2!} + \frac{Ø^4}{4!} + \frac{Ø^6}{6!} .. \qquad [3]$$

In this paper we will adopt the logic behind ς and we will modify it to a Norm $\vec{j} = (0 \quad i)$ and Anti-Norm $\overleftarrow{j} = (0 \quad -i)$ introduced in Section 1. The exponent of a null matrix, $\mathbb{N}$, is the exponent of the diagonal entries of the matrix (Weisstein, Matrix Exponential, 2004) i.e.

$$e^{\mathbb{N}} = e^{\begin{pmatrix}0 & 0\\0 & 0\end{pmatrix}}$$

$$\begin{pmatrix}e^0 & 0\\0 & e^0\end{pmatrix} = \begin{pmatrix}1 & 0\\0 & 1\end{pmatrix} \qquad [4]$$

Modifying [4] for $\vec{Ø}$ gives,

$$e^{\begin{pmatrix}0\\0\end{pmatrix}} = \begin{pmatrix}0\\0\end{pmatrix}^0 + \begin{pmatrix}0\\0\end{pmatrix}^1 + \frac{\begin{pmatrix}0\\0\end{pmatrix}^2}{2!} + \frac{\begin{pmatrix}0\\0\end{pmatrix}^3}{3!} + \frac{\begin{pmatrix}0\\0\end{pmatrix}^4}{4!} + \cdots$$

$$e^{\begin{pmatrix}0\\0\end{pmatrix}} = \begin{pmatrix}0^0\\0^0\end{pmatrix} + \begin{pmatrix}0\\0\end{pmatrix} + 0 + \begin{pmatrix}0\\0\end{pmatrix} + 0 + \begin{pmatrix}0\\0\end{pmatrix} + \cdots$$

Considering the result from [1],

$$e^{\begin{pmatrix}0\\0\end{pmatrix}} = \begin{pmatrix}1\\1\end{pmatrix} + \begin{pmatrix}0\\0\end{pmatrix} + 0 + \begin{pmatrix}0\\0\end{pmatrix} + 0 + \begin{pmatrix}0\\0\end{pmatrix} + \cdots$$

$$e^{\begin{pmatrix}0\\0\end{pmatrix}} = \begin{pmatrix}1\\1\end{pmatrix} \qquad [5]$$

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[3] Euler Expansion

[4] $0^0 = 0^{a-a} = \frac{0^a}{0^a} = 1$

At the end of the following section, we shall derive two dependent wave functions [9] and [10] we shall algebraically combine into a *Norm Wave Function*.

□ Corollary of the Introduction

In-closing the introduction section, we give the synopsis of the paper. We referenced the Theory of Special Relativity to motivate the ratio $\frac{0}{0} = 1$. In [1] and [2] we demonstrate that the idea of Calpanic Numbers can be justifiable as a fully-fledged proposition but with its own limit of reason. In [4] and [5] we demonstrate that $e^{\binom{0}{0}} = \binom{1}{1}$, which will be a crucial step in deriving the norm wave function.

§ THE NORM WAVE FUNCTIONS

For the position vector $\boldsymbol{j} = (\cos\odot \quad i\sin\odot)$ where $\Theta = \pi\,(a + \frac{1}{2})$, the direction of position vector $\boldsymbol{j}$ demonstrate the following behavior for $-\infty \le a \le \infty$,

$$\textit{Norm}\ \vec{j} = \begin{pmatrix}\cos\odot\\ i\sin\odot\end{pmatrix} = \begin{pmatrix}0\\ i\end{pmatrix} \qquad | \text{ for even } a$$

$$\textit{Anti-Norm}\ \overleftarrow{j} = \begin{pmatrix}\cos\odot\\ i\sin\odot\end{pmatrix} = \begin{pmatrix}0\\ -i\end{pmatrix} \qquad | \text{ for odd } a$$

In general, $\boldsymbol{j} = \sum_{-\infty}^{\infty} \begin{pmatrix}\cos\odot\\ i\sin\odot\end{pmatrix} = \sum_{-\infty}^{\infty} \begin{pmatrix}0\\ (-1)^a i\end{pmatrix}$ [6]

Well outside the domains and confines of Polar Space, we can expand the Norm geometrically as,

$$e^{\binom{0}{i}\bar{\varnothing}} = \binom{0}{i}^0 + \binom{0}{i}^1 \bar{\varnothing} + \frac{\binom{0}{i}^2 \bar{\varnothing}^2}{2!} + \frac{\binom{0}{i}^3 \bar{\varnothing}^3}{3!} + \frac{\binom{0}{i}^4 \bar{\varnothing}^4}{4!} + \frac{\binom{0}{i}^5 \bar{\varnothing}^5}{5!} + \cdots$$

$$e^{\binom{0}{i}\bar{\varnothing}} = \binom{1}{1} + \binom{0}{i} \bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} - \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} + \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots \qquad [7]$$

, and the expansion of the Anti-Norm,

$$e^{\binom{0}{-i}\bar{\varnothing}} = \binom{0}{-i}^0 + \binom{0}{-i}^1 \bar{\varnothing} + \frac{\binom{0}{-i}^2 \bar{\varnothing}^2}{2!} + \frac{\binom{0}{-i}^3 \bar{\varnothing}^3}{3!} + \frac{\binom{0}{-i}^4 \bar{\varnothing}^4}{4!} + \frac{\binom{0}{-i}^5 \bar{\varnothing}^5}{5!} + ..$$

$$e^{\binom{0}{-i}\bar{\varnothing}} = \binom{1}{1} - \binom{0}{i} \bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} + \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} - \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots \qquad [8]$$

Adding [7] and [8]

$$e^{\binom{0}{i}\bar{\varnothing}} = \binom{1}{1} + \binom{0}{i} \bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} - \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} + \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots$$

$$+$$

$$e^{\binom{0}{-i}\bar{\varnothing}} = \binom{1}{1} - \binom{0}{i} \bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} + \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} - \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots$$

$$e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}} = 2\binom{1}{1} - 2\frac{\bar{\varnothing}^2}{2!} + 2\frac{\bar{\varnothing}^4}{4!} - 2\frac{\bar{\varnothing}^6}{6!} + \cdots \ldots$$

□ $$\frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} - \binom{1}{1} = -\frac{\bar{\varnothing}^2}{2!} + \frac{\bar{\varnothing}^4}{4!} - \frac{\bar{\varnothing}^6}{6!} - \cdots \ldots$$

□ $$\frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} - \binom{1}{1} = \mathrm{Cos}\bar{\varnothing} - 1$$

□ $$\mathrm{Cos}\bar{\varnothing} = \frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} - \binom{1}{1} + 1$$

¶ $$\mathrm{Cos}\bar{\varnothing} = \frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} + 1 - \binom{1}{1}$$

If we let ${}^{1}_{1}\gamma = 1 - \binom{1}{1}$, then

¶ $$\mathrm{Cos}\bar{\varnothing} = \frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} + {}^{1}_{1}\gamma \qquad [9]$$

Subtracting [7] and [8] gives

$$e^{\binom{0}{i}\bar{\varnothing}} = \binom{1}{1} + \binom{0}{i}\bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} - \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} + \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots$$

$$-$$

$$e^{\binom{0}{-i}\bar{\varnothing}} = \binom{1}{1} - \binom{0}{i}\bar{\varnothing} - \frac{\bar{\varnothing}^2}{2!} + \frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^4}{4!} - \frac{\binom{0}{i}\bar{\varnothing}^5}{5!} - \cdots$$

$$e^{\binom{0}{i}\bar{\varnothing}} - e^{\binom{0}{-i}\bar{\varnothing}} = 2\binom{0}{i}\bar{\varnothing} - 2\frac{\binom{0}{i}\bar{\varnothing}^3}{3!} + 2\frac{\binom{0}{i}\bar{\varnothing}^5}{5!}$$

$$e^{\binom{0}{i}\bar{\varnothing}} - e^{\binom{0}{-i}\bar{\varnothing}} = 2\binom{0}{i}\left(\bar{\varnothing} - \frac{\bar{\varnothing}^3}{3!} + \frac{\bar{\varnothing}^5}{5!} - \cdots.\right)$$

¶ $$\mathrm{Sin}\,\bar{\varnothing} = \frac{e^{\binom{0}{i}\bar{\varnothing}} - e^{\binom{0}{-i}\bar{\varnothing}}}{2\binom{0}{i}} \qquad [10]$$

□ **Corollary of the Norm Wave Functions**

Now we must bear carefully in mind that a mathematical description of this kind i.e. [9] and [10] physically has ambiguous meaning unless we fully understand the full description of the attributes of the hypothetical wave functions. In the following section, we shall set boundary conditions to investigate the hypothetical wave nature which lurks in [9] and [10].

§ INITIAL BOUNDARY CONDITIONS

So far we came up with [9] and [10] but we need to demonstrate that the functions are wave functions. For us to reveal the attributes which lurks in the hypothetical wave functions [9] and [10], boundary conditions must be set and we must take into account the initial boundary conditions that define fundamental periodic wave functions[5]. If we assume the boundary condition $\bar{\varnothing} = 0$ in [9], such that if:

$\text{Cos}\bar{\varnothing} = \frac{e^{\binom{0}{i}\bar{\varnothing}} + e^{\binom{0}{-i}\bar{\varnothing}}}{2} + {}_{1}^{1}\gamma$ then by substituting the initial boundary condition gives:

$$\text{Cos}(0) = \frac{e^{\binom{0}{0}} + e^{\binom{0}{0}}}{2} + {}_{1}^{1}\gamma = \frac{2e^{\binom{0}{0}}}{2} + {}_{1}^{1}\gamma$$

$$e^{\binom{0}{0}} + {}_{1}^{1}\gamma = \binom{e^{0}}{e^{0}} + {}_{1}^{1}\gamma$$

but according to [5], ${}_{1}^{1}\gamma = 1 - \binom{1}{1}$, then substituting gives

$$= \binom{1}{1} + 1 - \binom{1}{1} = 1$$

Therefore $Cos(0) = 1$ and likewise $Sin(0) = 0$ [11]

Evidently the two equations we derived in [9] and [10] must express exactly the same thing as fundamental trigonometrical functions since both equations possess the same attributes as the Cosine and Sine functions respectively.

DISCUSSIONS & CONCLUSIONS

Clearly, there is a plethora of work we have demonstrated here in Part I of our proposition. On one, the achievements of the present proposition gives an important outcome i.e. we demonstrated that the wave functions [9] and [10] have non- primitive trigonometrical origins. Despite the fact that we have tried to distance the Norm representation from the Calpanic Formality, it is very much a part of it. What we have done is basically modified the Calpanic number and represented it as a state vector formalism defining directional singularities distorting Euler Rotations. Allow us to say that we do not claim to have solved the problem associated with rotational discontinuity in Euler Cycles or refuted Polar Coordinates but we merely believe that what we have presented herein is merely a state representation of discontinuities in discussion. In conclusions we say this:

Assuming the present philosophy has been conceived by mathematicians, we hereby make the following conclusion:

1. Discontinuities that distorts rotational symmetry in Euler Cycles are Imaginary Norms.
2. If proof [11] is correct, then the following identities must also be formalized:

   $0^0 = 1$ and $e^{\binom{0}{0}} = \binom{1}{1}$

§ REFERENCES

[1] Abubakr, M. (2008). *Witness the revolution, Cosmos Redefined.* India: Mohd Abubakr.

[2] Barukcic, J. P. (2016). Anti Aristotle-The division of Zero by Zero. *Journal of Applied Mathematics and Physics*, 1.

[5] The Sine and Cosine Functions.

[3] Weisstein, E. W. (2004). *Matrix Exponential*. Retrieved from Wolfram Alpha: http://mathworld.wolfram.com/MatrixExponential.html

[4] Weisstein, E. W. (2008). *Zero*. Retrieved from Wolfram Research: http://mathworld.wolfram.com/Zero.html