A New Mathematical Foundation

To study the universe, humanity, and *Triogenesis* as an inseparable whole, our existing mathematics are not yet natively compatible. Current mathematical systems arise from a fragmented and outward perspective — that of a local observer attempting to describe the universe from isolated points. They rely on definitions and axioms that partition possible relationships into separate domains and rule sets. While this has brought great precision, it also limits mathematics to externally imposed structures rather than internally generative ones.

The new math system we are developing aims to overcome this limitation. It supports both our unified knowledge map and the generative replica model. We call it the **Chained Structural Alignment** (CSA) system—or, by its nickname, *Infferus*, meaning "the formless whole that brings infinite rippling perspectives into itself, autonomously, across its infinite extent and resolution." Mapping our existing mathematical tools into this system will be a long-term project, but the foundations presented here are sufficient to begin that process.

Foundational Postulate

A perspective within *Infferus* can be represented by a well-defined mathematical system only if its definitions preserve the inseparable nature of the complete universe, described here as the formless whole.

Structure and Mathematical Representations

The native structures within the Formless Whole and the layers of Triogenesis are subject to different mathematical representations, depending on the definitions that establish a stabilized reference frame for each perspective.

This means that structure itself exists independently of any particular system of definition—whether expressed through numbers, logic, or sets. At the same time, the perspectives defined by such definitions, when constructed upon this foundation, are themselves a natural reflection of the whole. This is not paradoxical, for the formless whole inherently generates limitless perspectives of itself.

The Four Primitive Aspects of Infferus

All mathematical systems based on human definitions are higher-order constructs that emerge from our self-awareness and consciousness. They therefore rely on pre-definitional structures and alignments that make self-awareness possible in the first place. In other words, there exist chains of structural alignments that are primitive to the construction of any mathematically defined perspective we can understand.

Every definable quantity—whether a number, a function, or a physical constant—requires these primitive structures to exist. Hence, when constructing a mathematical definition, the definition must reflect the transformation of the pre-definitional structures from which it arises.

We can group—without implying separation—the structures of these primitive aspects into four descriptions. These classes follow the principle of alignment of existence: each is both the cause and the consequence of the others. The four descriptions, or representations, are *Recurrence*, *Geometry*, *Topology*, and *Chaos*. Note that the conventional meanings of these words are released here; their precise meanings within this context are given below.

Recurrence Describes the infinite extent, resolution, and ripple of self-reference. It is the operation through which the formless field renews and reflects itself continuously. When projected into traditional mathematics, recurrence appears as endless iteration, continuity, or recursion.

Geometry Describes the emergence of dimensionality from recurrence. Through stable folds of recurrence, degrees of freedom arise that later appear as measurable coordinates or magnitudes. Geometry provides the mapping that supports spatial and parametric structure.

Topology Describes the connectedness within recurrence. It determines how folds and ripples remain linked or separate, forming coherent patterns of relation. When expressed in modern mathematics, topology corresponds to the continuity and connectivity of structures.

Chaos Describes the correlation between what is observable (aligned) and what is concealed (unaligned). It measures the dynamic balance between order and uncertainty within recurrence. In projection, chaos appears as sensitivity, correlation, or probability.

Together, these four primitive descriptions form the complete basis of any definable projection:

> *Every definition arises from recurrence, geometry, topology, and chaos. Their interaction transforms the formless whole into the structures that traditional mathematics later describes.*

Fundamental Tools

The four primitive descriptions differ from most mathematical tools we currently employ. However, we already possess several basic tools that can help us construct and represent these foundational aspects. These include the natural constant e, the dimensionality constant π, the straintity structure $S_{n,m}$, the asymmetry structure $g(u)$, and the doubling constant d.

These tools describe pre-definitional structures while still allowing us to represent those structures within traditional mathematical frameworks such as the real number space $\mathbb{R}^n$ and the complex number space $\mathbb{C}^n$.

Let us briefly review them one by one.

The Natural Constant e. The constant e represents the infinite extent and resolution of recurrence. Although it can be expressed as a real irrational number on the conventional numerical axis, its natural

form, $(1 + 1/\infty)^{\infty}$, is inherently relational: $1/\infty$ expresses infinitesimal resolution, while the exponent ∞ expresses infinite extent. Thus, e is independent of any particular number system; it belongs to the pre-definitional structure of recurrence itself.

The Dimensional Constant π. The constant π describes the expansion of dimensionality. Its natural relational form is given by the Euler equation, $e^{i\pi} = -1$, which expresses the inherent growth of dimensional order by generating an inverted image within the infinite extent and resolution of e. This relationship is independent of any specific number system, though π can be represented within the real number space as an irrational quantity. It defines the curvature and cyclic nature of dimensional unfolding within the formless whole.

The Straintity Structure $S_{n,m}$. The straintity structure $S_{n,m}$ provides a topological description of the connectedness of recurrence. It represents how folds and alignments interlink across different scales of recurrence. Like e and π, it is inherently relational and independent of any particular number system. The indices n and m emerge only when we project this structure onto the numerical axes, serving as coordinate references for the otherwise relational network of connections.

The Asymmetry Structure $g(u)$. The function $g(u)$ describes the fundamental asymmetry of recurrence, and in its functional form can be written as

$$g(u) = -\frac{1}{\left(1 - \frac{1}{3}\right)u^3} \ln\left(\frac{1-u}{1+u}\right) - \frac{1}{\frac{1}{3}u^2}, \quad \text{for } 0 < u < 1.$$

At first glance, this expression may appear algebraic, yet the relationship it represents is independent of any specific number system. The logarithmic operation, ln, signifies the *undoing* of e—the infinite extent and resolution. This undoing permits re-referencing in an asymmetric form, $\frac{1-u}{1+u}$, so that self-reference can extend indefinitely.

Although the number 3 appears in the equation, it does so because the relationship expressed here represents the *minimal*, or simplest, form of asymmetry. Within our numerical framework, that simplest ratio corresponds to $1/3$; if the system were split into only two parts, no asymmetry would exist. The powers of u simply indicate dimensional relationships.

The variable u itself represents an infinite chain of self-referencing asymmetry differences, for example:

$$u = \frac{3-1}{187} + \frac{3-1}{187^2} + \frac{3-1}{187^3} + \cdots,$$

or equivalently $(7-5)/186$ when expressed through higher-order folding. It is therefore relational by nature: the numbers that appear here arise only when we cast these intrinsic differences into our conventional numerical system.

The Doubling Constant d. The final and most crucial tool is the doubling constant, d. It describes the replication or bifurcation of perspectives, represented by the relationship

$$\frac{1}{\left(1 \pm \frac{1}{3}\right)^{12} g(u)^d} = 2.$$

Here, the term $(1 \pm \frac{1}{3})^{12}$ is a rational factor, where the plus–minus sign indicates the alternation of the direction of asymmetry, each case

occurring exactly half of the time. Because the constants e, π, $S_{n,m}$, and $g(u)$ are projected together onto the real number axis as definite values, they become fixed and fully certain relationships within our numerical reference frame.

To complete the description of the inseparable whole, d represents all remaining possibilities and uncertainties—the chaotic and autonomous patterns inherent to the structure itself. This chaotic component must also ripple into the numerical axis, ensuring that all five tools are mutually cause and effect of one another.

The natural form of d can be written as a continued fraction:

$$d = 180 + 15 + \frac{1}{3} - \cfrac{1}{187 + 15 + 15 + 3 + \cfrac{1}{15 - \frac{1}{3} + \cfrac{1}{173 - 15 - 15 - 15 + 1 - \frac{1}{3} - \cfrac{1}{180 - 15 - 15 - 7 + 2(1 - \frac{1}{3} + x)}}}}$$

Before the relationship represented by continued term x, this fraction represents the relationships within the asymmetric recurrence. From x onward, the structure becomes chaotic: it may bifurcate, loop, or oscillate around the perfect ratio of 2. When we use 1 and 2 to construct our natural number axis, this structure is likewise projected into the natural numbers, giving rise to the apparent chaotic ordering seen in the prime numbers—a behaviour that underlies many open problems centred around the numbers 2 and $\frac{1}{2}$. Through certain transformations, such oscillations also appear in analytic functions related to the distribution of primes, such as those studied in Riemann's theory.

The Definition of Reference Frame is Flexible

This foundation allows us to define both quantifiable and non-quantifiable *Infferus* perspectives mathematically. A reference frame in this context is not fixed to physical coordinates or numerical domains; rather, it is any stabilized alignment within the formless whole that allows relations to be observed and compared. Such a frame can be physical, conceptual, or experiential, depending on how the primitive aspects of recurrence, geometry, topology, and chaos are projected.

For example, our individual consciousness can be viewed as a composite reference frame, defined by all sensory signals—vision, touch, hearing, proprioception, and motor feedback— all enclosed in a layered description of the four primitive aspects. Every sensory signal can be mapped quantitatively into a high-dimensional number space, where its stable patterns appear as certain and measurable structures. Yet the continuous flow and transformation of these signals also carry the concealed or chaotic component of the whole, the part that remains beyond direct quantification but still shapes perception, awareness, and response.

In this sense, a conscious experience is a dynamic projection of the formless whole within a self-organized reference frame. All further structure and understanding arise from that conscious frame, because, strictly speaking, we cannot observe anything in isolation from our collective consciousness.

By redefining the reference frame—for instance, shifting from neural activity to emotional state, from collective interaction to conceptual understanding, or even to the quantifiable values of physical constants and numbers themselves— we are effectively redirecting atten-

tion within the inseparable whole. This is analogous to the shifting of attention in a transformer neural network, except that here the transformation must encompass the *entire* perspective of the whole, in accordance with the foundational principles presented here.

Through such complete transformations, we can describe new layers of *Infferus* mathematically without ever departing from the same unified foundation.

Chained Structural Alignment (Infferus): Foundational Layers and Primitive Aspects of Structure