Extended Imaginary Number Theory

A Conceptual Framework for the Dual Structure of Existence

$$Z = D + iD$$

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Abstract

This paper presents *Extended Imaginary Number Theory*, a conceptual framework that describes the structure of existence as a superposition of a real-dimensional aspect (D) and an imaginary-dimensional aspect (iD). The real dimension comprises the totality of structural aspects of an object that currently bear meaning—whether observed, articulated, conceptualized, imagined, or projected as hypothesis. The imaginary dimension refers to **the pre-meaningful, non-manifest, non-defined structural surplus that accompanies an object**. Drawing on a structural analogy with complex numbers, the totality of these aspects is denoted $Z = D + iD$. Here Z denotes a conceptual totality through which the existence of an object is described; D and iD constitute, respectively, its articulated component (corresponding to the real part of a complex number) and its non-articulated component (corresponding to the imaginary part). The paper provides (1) conceptual definitions of the real and imaginary dimensions and an explicit clarification of their boundary, (2) five axioms governing their relationship, (3) structural implications derivable from this framework, and (4) connections to phenomenology, cognitive science, complex-systems theory, and machine learning. The framework employs mathematical notation as a structural analogy for conceptual description of cognitive and ontological structures; it does not claim algebraic rigor in the sense of pure mathematics.

Keywords

extended imaginary number theory; real dimension; imaginary dimension; dual structure of existence; structural surplus; ontological framework; conceptual framework; cognitive dimensional space; phenomenology; complex systems; structural analogy; philosophy of mind

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Contents

01 Introduction

1.1 Background: Structure Prior to the Constitution of Meaning

Existing descriptive frameworks describe what bears meaning within them. Yet the question of how to address structures that have not yet emerged as meaningful—structures prior to the very constitution of any descriptive framework—has long remained unaddressed.

This is not a question of epistemic insufficiency, of the form "there are still things we do not know about this object." The moment one can say "we do not yet know X," X has already entered the domain of meaning as something knowable. What this paper raises is a prior domain—a domain that cannot even be named as "unknown," a structural non-locus that has not yet taken the form of concept, imagination, anticipation, or hypothesis.

Existing epistemology tends to dispatch this domain under labels such as "the unknowable," "the mystical," or "the metaphysical." Yet this dispatch is a gesture that excludes the domain from the scope of description, denying it any positioning as a structural layer accessible through extension of the framework. The **Extended Imaginary Number Theory** presented here is a conceptual framework for describing this domain as a structural non-locus.

1.2 Two Central Concepts: Real and Imaginary Dimensions

The framework centers on the following pair of concepts.

The **real dimension** (D) refers to the totality of structural aspects of an object that currently bear meaning. What is observed, what is articulated, what has taken the form of concept, what is projected as imagination, anticipation, hypothesis, or possibility—all of these have already entered the domain of meaning and belong to D. To "bear meaning" here means to have taken some form within the cognitive framework of the subject or community in question; it does not require explicit observation.

The **imaginary dimension** (iD) refers to **the pre-meaningful, non-manifest, non-defined structural surplus that accompanies an object**. iD is not a "layer" or "thing" that exists independently of the object; rather, it is the surplus that the description in the real dimension necessarily leaves behind. iD is also not an unknown fact about the object. Whatever can be named as

"unknown" has already entered the domain of meaning as something knowable. *iD* refers to what lies prior to this—what cannot be named, the structure prior to conceptualization, the surplus that remains even after the description in the real dimension is established.

The totality of both is denoted, by structural analogy with complex numbers, as follows:

$$Z = D + iD$$

Here *Z* denotes a conceptual totality through which the existence of the object is described. *Z* decomposes into two orthogonal components: *D* is the articulated component of *Z* (corresponding to the real part of a complex number), and *iD* is the non-articulated component of *Z* (corresponding to the imaginary part). Both coexist as orthogonal dimensions within the same *Z*; *articulation*—the transition from *iD* to *D*—is understood not as the extension of an axis but as a qualitative transformation within *Z*.

i serves as **a structural marker indicating an axis that is not directly observable but is introduced for the coherence of the description of existence**, and is not, as discussed below, an algebraic operator of multiplication.

1.3 Mathematical-Historical Source: The Precedent of Imaginary Numbers

The legitimacy of this framework's borrowing of mathematical notation lies not in mere convenience but in a genealogical inheritance of problem-consciousness from a specific event in the history of mathematics—the invention of imaginary numbers.

In the sixteenth century, in Cardano's work on the solution of cubic equations, the quantity $\sqrt{-1}$ was found to appear unavoidably in intermediate steps of calculation. This quantity corresponded to no position on the real number line, and Cardano himself described it as "as subtle as it is useless." For a long time, whether to acknowledge its existence remained suspended, and it was treated as an "imaginary number" (Nahin, 1998). Humanity, in effect, once attempted to treat this quantity as if it did not exist.

Yet the coherence of structure did not permit this exclusion. From the late eighteenth to the nineteenth century, Wessel, Argand, and Gauss independently succeeded in coordinatizing imaginary numbers as an independent axis orthogonal to the real number line, thereby positioning their existence structurally. Gauss later argued that the name *imaginary* was a mistake and that these are completely real quantities (Gauss, 1831). What had initially been regarded as merely "imaginary" was in fact a reality demanded by logical necessity for structural coherence—a reality, however, that does not appear as an object of observation.

This trajectory corresponds structurally to the problem-consciousness of the present framework. We coordinatize, as an independent and orthogonal descriptive axis, the aspect of an object whose existence is required by the coherence of its structure but which does not become an object of

observation. This is the **transposition** of the operation performed in the invention of imaginary numbers—from the domain of numbers to the general domain of the description of existence. The *i* in this framework is therefore not a mere notational convenience but a marker that inherits, into the description of existence, the problem-consciousness of one of humanity's earliest systematic attempts to coordinatize the invisible.

(Note: *The above mathematical-historical account is a summary intended to bring out the problem-consciousness of this framework; for more rigorous historical treatment, the reader is referred to specialist sources such as Nahin (1998). The pair of concepts "real" (実) and "imaginary" (虚) also intersects with East Asian metaphysics; this point is discussed separately in §6.3.*)

1.4 Why "Imaginary" and Why "Dimension"

Two motivations for the naming should be made explicit.

First, the term **imaginary** inherits the historical positioning of imaginary numbers described in §1.3—quantities that are not objects of observation but whose existence is required by structural coherence. Just as the imaginary axis is orthogonal to the real number line, this framework intends a spatial metaphor: against the structures that currently emerge as meaning (the real dimension), the layer prior to meaning-formation (the imaginary dimension) extends in an independent direction. However, while the imaginary unit *i* is an algebraic coefficient multiplied with numerical values, the *i* in this paper is a conceptual notation indicating orthogonality with respect to the structure of an object's existence. What this framework borrows is the operation of "establishing an orthogonal independent axis"; it does not borrow the algebraic operations of complex numbers (such as $i^2 = -1$), polar form, or complex-analytic properties. The two are essentially different.

Second, the term **dimension** is used because the recognition of the imaginary dimension is not merely "the addition of an attribute" or "the discovery of an element," but the opening of a new axis within cognitive space itself. Gambling and chance phenomena, for instance, had existed since antiquity, but only in the seventeenth century, when Pascal and Fermat established the concept of probability through their correspondence, was uncertainty incorporated into cognitive space as an independent quantifiable axis. Although the phenomenon had existed before, until the concept that coordinatizes it was established, that axis did not exist within cognitive space. The manifestation of the imaginary dimension describes a cognitive event structurally isomorphic to this.

1.5 Methodological Note

This paper presents a conceptual framework, and mathematical notation is used as a structural analogy. It does not claim the algebraic rigor of complex numbers, nor isomorphism with the inner product structure of Hilbert space. The framework is positioned as a transposition of mathematical structure into the description of existence, intending the inheritance of a way of seeing structure

rather than strict isomorphism with the original. The discussion below borrows the geometric and structural properties of complex numbers for the organization of cognitive structure and the description of existence; it is intended to serve as a conceptual scaffolding for researchers in adjacent fields to organize their working hypotheses.

An important self-limitation must be made explicit here. This paper does not directly describe *iD* **itself**. As long as *iD* is defined as "the surplus prior to the constitution of meaning," any direct description of it is self-contradictory: at the moment something is described as meaningful, it belongs to *D*. What this paper describes is the **non-closability of D**—by which is meant the structural fact that the description in the real dimension cannot constitute a self-contained, complete description of any object—and *iD* is positioned as the structural surplus that this non-closability requires. The claim of this paper is therefore not "iD is such-and-such," but rather: **"D cannot constitute a closed description; without iD as required surplus, the limit of D cannot be explained."** This self-limitation runs through the entire argument of the paper.

This paper, however, does not merely assert the non-closability of *D*. To position that non-closability as a structurally independent direction within the description of existence, the paper introduces *iD* as an orthogonal axis. That is, *iD* is not specified negatively as the *mere incompleteness* of *D*; it is positioned positively, within *Z*, as a structural direction irreducibly distinct from *D*.

1.6 Scope and Related Papers

This paper concentrates on establishing the core of **Extended Imaginary Number Theory**—the dual structure of existence as $Z = D + iD$. The formalization of specific operators acting upon this framework (such as the imaginary-dimension extraction operator, the shielding operator, and the vowel operator) is deferred to separate papers. The present paper is positioned as the ontological foundation for that subsequent research on the system of operators.

02 Definitions and Notation

Definition 1 **Object**

Let *X* be a descriptive object in this framework. *X* may take any form—physical thing, social organization, cognitive state, concept, or relation. *X* is understood not as a fixed entity but as a unit of existence referred to by a cognitive subject. The set of objects is denoted $\mathscr{X}$.

Definition 2 **Real-Dimensional Component**

For an object $X \in \mathscr{X}$, the **real-dimensional component** $D(X)$ is defined as the totality of structural aspects of *X* that are currently observable, describable, and shareable by the subject or cognitive community.

$$D(X) = \{\, \xi \mid \xi \text{ is a structural aspect of } X \text{ currently articulated} \,\}$$

$D(X)$ includes quantitative observational values, articulated descriptions and classifications, positions within agreed-upon classification systems, and explicit relations.

Definition 3 **Imaginary-Dimensional Component**

For an object *X*, the **imaginary-dimensional component** *iD(X)* is positioned as the structural surplus that accompanies *X* and *can only be indicated* as pre-meaningful, non-manifest, non-defined. That is, *iD(X)* is not a "thing" that exists independently of *X*; it is the surplus that the description of *X* in the real dimension necessarily leaves behind. *iD(X)* is not an unknown fact about *X*, nor a concept yet to be articulated, nor an attribute yet to be noticed. In the framework of this paper, such items remain within the domain of meaning-formation and are positioned on the side of *D*. *iD(X)* refers to the surplus prior to the very emergence of this movement of meaning-formation. The notion of *surplus* employed here must also be distinguished from the *residual*, *remainder*, or *error term* of machine learning and statistics: those are quantities defined within an existing meaning-framework and therefore belong to *D*. *iD* is qualitatively different—a structure prior to meaning-formation itself.

Definition 4 **Totality of Existence**

For an object *X*, the **totality of existence** *Z(X)* is defined as the structural sum of the real- and imaginary-dimensional components. *Z(X)* denotes the totality that constitutes the existence of the object; its description is the subject matter of this framework. That is, this paper does not claim direct access to *Z(X)* as such, but presents a conceptual apparatus for describing *Z(X)* as a dual structure of *D* and *iD*.

$$Z(X) = D(X) + iD(X)$$

Here "+" is not a set-theoretic union but a conceptual notation expressing the superposition of two orthogonal structural components. *D* is the articulated component of *Z* (corresponding to the real part of a complex number); *iD* is the non-articulated component of *Z* (corresponding to the imaginary part). Both are positioned as orthogonal dimensions coexisting within the same *Z*. The symbol *i* is a structural marker indicating the independence of the real and imaginary dimensions; it is not an algebraic operator of multiplication.

Definition 5 **Cognitive-Dimensional Space**

Let *C(S, t)* denote the totality of real-dimensional components captured by a subject *S* at time *t*, called *S*'s **cognitive-dimensional space**. *C(S, t)* is a set that may vary with time.

What Should Be Distinguished from iD

In this framework, all of the following belong to D, not to iD:

1. Mere informational insufficiency, the unknown, facts not yet observed.
2. Hypotheses, anticipations, imaginings, projections of possibility.
3. Computational and cognitive structures such as tacit knowledge, latent variables, and variational hidden representations.
4. Noise, randomness, measurement error.

All of these have already entered the domain of meaning in some form, or are objects handled within a meaning-framework. *iD* refers to a **qualitatively different** surplus—the structural surplus prior to the constitution of meaning. The claim of this framework is to position, within the description of existence, a structural dimension distinct from the totality of existing epistemological categories that include the unknown and the latent.

Note: *The Z(X) of this paper is not, like complex-valued functions or elements of Hilbert space, an object on which algebraic operations are defined. It is a conceptual totality for describing the structure of an object's existence; algebraic structures such as addition, multiplication, and inner product are not separately given. The purpose of borrowing the notation of complex numbers is to express concisely the simultaneous holding of two orthogonal aspects.*

03 Axioms

As the foundational presuppositions of this framework, the following five axioms are presented. They are not stipulations about operations or procedures but claims about the structure of existence.

Axiom 1 Non-Closability of D

For any object $X \in \mathscr{X}$, $D(X)$ does not by itself constitute a closed description. The description in the real dimension is necessarily accompanied by structural surplus that cannot be incorporated by that description. The present paper denotes this surplus as *iD*.

$$\forall X \in \mathscr{X}:\ D(X) \subsetneq Z(X),\quad \textit{that is,}\quad iD(X) \neq \varnothing$$

There is no description complete in the real dimension alone. The *D* of any object necessarily accompanies *iD* as the expression of its non-closability.

Axiom 2 Internality

The imaginary-dimensional component does not lie outside the object but belongs to its internal structure.

$$iD(X) \subseteq Internal(X)$$

The imaginary dimension is not a metaphysical "other world" but a non-articulated layer folded into the internal structure of the object. "Not yet captured" does not mean that something unknown lies *outside* the object; it means that the object itself contains non-manifest structure.

Axiom 3 Orthogonality

The real- and imaginary-dimensional components coexist as orthogonal components within *Z*.

$$D(X) \perp iD(X) \quad \textit{within } Z(X)$$

"Orthogonality" here does not mean zero algebraic inner product. It refers to irreducibility within *Z*: quantitative extension of one component does not yield the other. Exhaustive extension of the real dimension cannot reach the imaginary dimension—for whatever is reachable through quantitative extension still belongs, at that very moment, to the continuum of meaning-formation. *Articulation*—the transition from *iD* to *D*—is not an extension of an axis but a qualitative transformation within *Z*. Just as the real and imaginary axes are orthogonal in the complex plane, the two dimensions constitute independent descriptive axes within *Z*.

Axiom 4 Non-Finality of Description

For any subject and time, complete description of *Z(X)* is impossible.

$$\forall S,\ \forall t:\ C(S, t) \subsetneq Z(X)$$

The cognitive-dimensional space of a subject *S* always remains a proper subset of *Z(X)*. Description is approximate, partial, and provisional; this is not a limitation of any particular subject but a structural feature of the very enterprise of description.

Axiom 5 Mobility of the Boundary

The boundary between the real and imaginary dimensions is not fixed; it shifts with cognitive progress. A structural element ξ that is retrospectively understood to have been positioned on the side of $iD(X)$ at time t_1 may, through cognitive progress, become articulated as $D(X)$ at time t_2 ($t_1 < t_2$).

$$\xi \in iD(X) \mid t_1 \implies \xi \in D(X) \mid t_2 \quad \textit{(as a possibility)}$$

By Axiom 4, however, $iD(X)$ as a whole never disappears. Cognitive progress is a process that gradually transitions the imaginary dimension into the real dimension, but the imaginary dimension itself is not depleted. The acquisition of new real dimensions simultaneously opens new horizons of imaginary dimensions.

04 Structural Implications

From Axioms 1–5, several structural implications for the practice of describing existence follow.

4.1 Constitutive Non-Locality

By Axioms 1 and 2, the non-closability of D is not a contingent attribute of an object but a constitutive feature. The surplus iD is not something lying outside the object but a surplus that accompanies the object itself. This implication imposes a principled limit on the naive realist attitude that identifies an object with "the part that currently bears meaning."

4.2 Asymptotic Description

By Axioms 4 and 5, cognitive progress gradually transitions the imaginary dimension into the real dimension, but complete arrival at $Z(X)$ is structurally impossible. This has the structure of *asymptotic description*. The totality of the imaginary dimension is never exhausted; this is not the structure of perpetually missing a fixed target, but rather the generative structure of expansion in which cognitive progress itself opens new horizons of the imaginary dimension.

Proposition 1 (Non-Disappearance of the Horizon).

From Axioms 1 and 5, however much the cognitive-dimensional space $C(S, t)$ is extended, $iD(X)$ remains non-empty.

Proof (sketch). Axiom 1 is asserted universally over time: for any time t, $iD(X) \mid t \neq \varnothing$. The boundary movement specified in Axiom 5 transitions some elements of $iD(X)$ into $D(X)$, but Axiom 1 guarantees that $iD(X)$ does not become empty. Therefore, at any time, $iD(X) \neq \varnothing$ holds. ∎

4.3 Non-Closability of Knowledge Systems

It is in principle impossible for any system of knowledge to be "complete." Any system always contains, internally, structures not yet manifested. This is not a limitation of any particular subject or system but a structural feature of cognition itself, derived directly from Axioms 1, 4, and 5.

4.4 Implications for Descriptive Practice

The convention of describing only the real dimension is, in light of Axiom 1, an intentional or unintentional approximation of Z. Practices such as research, diagnosis, evaluation, and design reach more honest description by presupposing the existence of the imaginary dimension and acknowledging the unavoidable approximation. This framework provides explicit ontological positioning for such descriptive practices.

4.5 The Dual Responsibility of Description

Under this framework, anyone who describes an object simultaneously bears two responsibilities. First, to describe as precisely as possible the structures currently captured as the real dimension. Second, to explicitly acknowledge and reserve the fact that this description does not close—that *iD* as surplus necessarily accompanies it. The latter responsibility functions as a structural defense against the illusion of having completed the former.

05 Relations to Existing Frameworks

This framework is positioned as an attempt at integrative description—mediated by the structural analogy with imaginary numbers—of a common problem addressed across phenomenology (Husserl's horizon structure, Merleau-Ponty's bodily latency), poststructuralism (Lacan's *Réel*, Deleuze's *virtuel*), the tacit knowledge of cognitive science (Polanyi), the emergence of complex-systems theory, and the latent representation of machine learning—namely, the problem of "structures that cannot be captured by articulated/manifest description."

This section surveys how the framework connects with these existing philosophical and scientific traditions. These connections are structural analogies; they do not claim complete identity with any tradition. The originality of this framework lies not in the discovery of a new concept but in the integrative positioning, under the single structural description $Z = D + iD$, of problems that the various traditions have addressed individually.

5.1 Phenomenology: Horizon Structure and Bodily Latency

Husserl's **horizon structure** (*Horizontstruktur*) refers to the structure that lies on the periphery of an emerging object—a structure not directly objectified yet enabling the object's recognition. The imaginary-dimensional component of the present paper can be read as a concrete form of the structural side of this horizon. Merleau-Ponty's **bodily latency** likewise treats the non-thematic structural substrate that precedes the objective content of perception, and may be positioned as one of the phenomenological sources of the concept of imaginary dimension.

5.2 Tacit Knowledge and Cognitive Science

Polanyi's **tacit knowledge** refers to a layer of knowledge that supports the practice of cognition without being explicitly articulated. Under this framework, tacit knowledge is strictly positioned at the periphery of *D*: insofar as it is functioning cognitively, it has already entered the domain of meaning. However, the structural ground on which tacit knowledge depends—the substrate prior to meaning-formation that constitutes why tacit knowledge can function cognitively at all—falls within the scope of *iD*. The framework recasts the phenomenon of tacit knowledge as an event at the interface between *D* and *iD*. The framework of **embodied cognition** by Varela, Thompson, and Rosch likewise addresses similar boundary cases by claiming that cognition includes dimensions that cannot be reduced to explicit representation.

5.3 Emergence in Complex Systems

In complex-systems theory, **emergence** refers to the appearance of higher-order structures that cannot be reduced to a simple sum of constituent elements. Against this phenomenon—often expressed as "the whole exceeds the sum of its parts"—this framework offers a partial description by distinguishing two different mechanisms of transition.

The first mechanism is **the transition from iD to D accompanying a shift in perspective**. The formation patterns of flocks, or the culture of an organization, are structures that cannot be captured by individually observing constituent elements but emerge as meaningful from the perspective of the whole. This may be reformulated as follows: what remains as a structure not reaching *D* from the perspective of the parts is positioned as *iD* from that perspective; when the perspective shifts to the whole, it emerges as *D*. What moves here is the perspective of the observer.

The second mechanism is **the transition from iD to D accompanying constitutive realization**. Observing cells, blood, bones, and muscles individually does not bring *life* into their *D*. Yet when these are arranged in a specific relational configuration—when the conditions for constitutive realization are met—what was positioned as *iD* in each element, that is, as a pre-meaningful, non-manifest surplus, emerges as the *D* of a higher-order existence. What moves here is not the observer but the constitutive state of the object itself.

The framework only provides **vocabulary for describing** these transitions; it does not directly address the **mechanism** of the transition—under what conditions and in what manner *iD* is realized as *D*. In particular, regarding the second mechanism, the elucidation of the generative structure that makes constitutive realization possible remains an open question on top of this framework. These are tasks to be developed in subsequent research as a system of operators acting on the imaginary dimension.

5.4 Distinction from Latent Variable Models

In machine learning, **latent variable models**—in particular, variational autoencoders—treat low-dimensional hidden representations hypothesized to generate observational data. These are not directly observed but are inferentially constructed, model-dependent representations defined within an existing meaning-framework. Latent variables thus belong, definitionally, to the domain of D: even when not observed, they are constituted as objects within the same epistemic structure that D inhabits.

Latent variable models share with the concept of imaginary dimension a structural resonance: both treat an axis of representation independent of the observation space (the real dimension). However, whereas latent variables are **computable, defined objects**, the iD of this framework is **non-defined and non-computable**. The two are easily confused but belong to fundamentally different layers. By making this distinction explicit, the present section fixes the position of the framework.

5.5 Distinction from Complex Numbers and Hilbert Spaces

The $Z = D + iD$ of this framework is not an object equipped with the algebraic operations of complex numbers or the inner product structure of Hilbert space. While complex analysis treats the analytic properties of continuous mappings, and the state space of quantum mechanics describes the superposition of probability amplitudes, this framework is a device for the conceptual notation of the duality within an object's structure of existence. The relation between the two is structural analogy, not algebraic isomorphism.

06 Discussion and Limitations

6.1 The Problem of Empirical Verifiability

Insofar as the imaginary-dimensional component $iD(X)$ is defined as surplus accompanying D, any procedure to verify its content directly through empirical means is structurally difficult. What can be verified is only the fact that the description in the real dimension does not close at any stage. The framework does not, therefore, satisfy the usual criteria of Popperian falsifiability. It is, however, not a system of hypotheses for predicting individual phenomena but functions as an epistemological attitude or a framework for descriptive practice; it belongs to a different context of justification. The practical value of this framework should be evaluated in subsequent operator-based and applied research, by whether the concept of imaginary dimension yields meaningful distinctions and practical guidance.

6.2 The Risk of Vacuity

The claim that "the description of any object in the real dimension does not close" approaches vacuity insofar as nothing concrete is said about the mechanism of this non-closability. The framework

cannot directly describe the surplus *iD*—since *iD* is, by the framework's definition, positioned as the side at which the description in the real dimension cannot be established—but its practical value lies in two points. First, by explicitly positioning the necessity of this surplus, it becomes possible to distinguish, as a separate structural domain, those events in current reality that cannot be captured by existing epistemological categories (the unknown, the latent, the tacit, etc.). Second, in subsequent research on the system of operators, the mechanism of transition from this surplus to *D* is to be formalized. The present paper lays that foundation; it is not self-completing.

6.3 Relation to East Asian Metaphysics

The pair of concepts "real" (実) and "imaginary" (虚) is not unrelated to the East Asian metaphysical traditions—particularly the 無 (*wu/mu*, nothingness) of Daoist thought and the 空 (*kū/śūnyatā*, emptiness) of Buddhism. This framework does not intentionally claim a direct genealogical relation with these traditions, yet there remains room for it to be read as a structural analogy.

In particular, the Daoist 無—as a *productive nothingness* that gives rise to existence—occupies a position functionally analogous to the *iD* of this framework. Both lie prior to what currently emerges as meaning (*D* or 有, *being*) and are positioned as the *moment* that makes that emergence possible. The framework, however, remains a structural description without specific cosmological or soteriological implications, and is not a direct extension of Daoist thought.

Nor is the "imaginary" of this paper identical to the Buddhist 空 (*śūnyatā*). Whereas the latter implies the negation of the substantiality of all things, the imaginary dimension of this paper is positioned as a structural non-locus relative to the object—constitutively, in relation to it. Detailed comparative examination is left for future work.

6.4 Future Tasks

This framework presents only a mode of describing existence (the structural positioning of *D* and *iD*) and does not directly address the **transition from iD to D**—under what conditions and in what manner does latent structure emerge as articulated structure. The following are anticipated as tasks to be developed on top of this framework:

1. Theorization of the mechanism of transition from *iD* to *D*—articulation, boundary-formation, and the conditions and mechanisms of meaning-formation. The framework treats this in separate papers as a system of operators acting on the imaginary dimension (the imaginary-dimension extraction operator, the shielding operator, the vowel operator, etc.).
2. Empirical connection in applied domains—cognitive science, social science, organizational research, and so on: examination of whether the vocabulary of the framework yields meaningful distinctions in the description of individual events.

3. Comparative examination with existing philosophical concepts—refinement of relations with concepts structurally analogous to this framework, such as Lacan's *objet petit a*, Deleuze's *virtuel* and *actuel*, and Heidegger's *Sein/Seiendes*.
4. Category-theoretic structuring—an attempt at formalization treating *D*, *iD*, and the mappings between them (the *articulation* operation) as objects, morphisms, and functors.

07 Conclusion

This paper has presented **Extended Imaginary Number Theory**—the description of existence as $Z = D + iD$—as a conceptual framework centered on five axioms. By positioning, as constitutive components of the description of existence, both the real dimension (the structural side that currently bears meaning) and **the imaginary dimension that necessarily accompanies the description in the real dimension—the pre-meaningful, non-manifest, non-defined structural surplus**—the framework makes explicit that the incompleteness of description is not a limitation of the capacity of the subject but a structural fact.

This explicit positioning offers, against the conventional descriptive practice that treats latency as peripheral residue, an alternative perspective that places latency at the center. Practices such as research, diagnosis, evaluation, and design gain, under this framework, a foundation for a more honest epistemological attitude—one that handles the described portion precisely while constantly acknowledging the structural existence of the undescribed.

This framework, in itself, only presents a mode of ontological description; it does not provide concrete means of access to or operational unfolding of the imaginary dimension. These are to be developed in separate papers as a system of operators acting on top of this framework. The present paper is positioned as the ontological foundation for that system.

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