Research Monograph Series

The Theory of Language Derivatives:

Inverse Problem Art and the Leverage Structure of AI Hallucinations

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Version: 1.0
Last Updated: July 23, 2026
Status: Ongoing Research

Research Monograph

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Version 1.0, July 2026

Publication Information

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Suggested Citation

Tanaka, Tomokazu (bigakusha-haha). 2026. *The Theory of Language Derivatives: Inverse Problem Art and the Leverage Structure of AI Hallucinations*. Research Monograph Series, Version 1.0. Sayama Aesthetics School / Institute of Aesthetics.

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Abstract

This paper reexamines the conventional understanding of hallucinations in generative artificial intelligence, not merely as information-processing errors, failures of factual recognition, or technical defects to be eliminated, but as phenomena of a generative structure that this paper calls **Language Derivatives**. A Language Derivative is not language that directly represents existing facts or objects. It is a derivative linguistic structure that folds meanings, relations, values, and future possibilities that have not yet been actualized into the present linguistic space in advance, thereby amplifying their potential realization.

Just as financial derivatives are derived from underlying assets while incorporating future price fluctuations into the present and generating large gains or losses from limited capital through leverage, the outputs of generative AI are derived from an existing linguistic underlying asset - training data - while generating sentences, concepts, causal relations, and narratives that are not explicitly present within that data. This generation is not a simple reproduction of existing information. Artificial intelligence compresses vast linguistic relations and, with a limited prompt as an occasion, unfolds those latent relations into a particular response. In this sense, a prompt can be understood as a small speculative position in linguistic space, while the generated result is a linguistic position amplified by that speculation.

This paper defines this structure as **Language Leverage**. Language Leverage is an asymmetric amplification process in which a limited input activates a vast relational space within training data and produces semantic effects, cognitive consequences, and social impacts far exceeding the scale of the input. Hallucination becomes manifest when this leverage operates beyond established factual reference. Accordingly, hallucination should not be defined merely as "stating that something nonexistent exists," but as a condition in which derivative linguistic generation has lost the conditions required for connection to reality.

To formulate this redefinition, the paper introduces the distinction between **forward problems** and **inverse problems**. In a forward problem, a correct result is derived from known causes, laws, or conditions. Within such a framework, an AI response that departs from a predetermined correct answer is clearly an error. In an inverse problem, by contrast, hidden structures, causes, meanings, or possible worlds must be inferred from observed fragments, outcomes, or incomplete information. Solutions are not uniquely determined, and multiplicity, instability, and non-solvability are structurally involved. Generative AI is often used as though it were a forward-problem answer machine, while its actual linguistic generation operates through an inverse-problem mode of estimation. This asymmetry between expectation and mechanism constitutes one of the fundamental conditions under which hallucinations arise.

This paper does not, however, reject inverse-problem generation as such. From the standpoint of **Inverse Problem Art**, proposed in the author's earlier practice and theory, generation in domains without predetermined correct answers is understood as an artistic, epistemological, and ontological possibility. Inverse

Problem Art is not the production of correct answers to already given problems. It is a practice that reconstructively generates previously unrecognized problems, structures, relations, selves, and possible worlds from fragments of reality. Its aim is not to stabilize falsehood as fact, but to design conditions under which undetermined possibilities can become connected with reality.

From this perspective, AI hallucination and artistic generation share the capacity to produce possibilities beyond existing reality, yet they are not identical. Artificial intelligence statistically and linguistically generates possibilities of what is other than the self. Art, by contrast, transforms perception, embodiment, action, relation, and self-recognition through an encounter with what is other than the self. If artificial intelligence is a device that externalizes other possibilities, art is an interface that reconnects those possibilities to transformations of the self and reality.

A central role here is played by **Interface Ontology** within Generative Topological Ontology. In this paper, an interface is not a neutral instrument that merely mediates between artificial intelligence and human beings, language and reality, possibility and fact, or self and what is other than the self. It is an event-condition that preserves differences between distinct topologies while generating new connections and new modes of being. Hallucination becomes problematic not because generated language is not reality itself, but because the topological difference between the generated product and reality is concealed, and distinctions among hypothesis, metaphor, estimation, creation, and fact are lost. What is therefore required is not only the total elimination of hallucination, but the visualization of the topology to which a generated product belongs and of the conditions under which it can participate in reality.

This paper discusses that process of connection as **Reality Grounding**. Reality Grounding does not simply mean that generated language agrees with existing facts. It is the process through which generated possibilities produce concrete transformations within the relational structure of reality through verification, embodied experience, social practice, relations with others, creative production, institutional procedures, and other forms of engagement. The boundary between hallucination and creativity therefore lies not in novelty itself, but in whether generated content possesses responsiveness and connectability toward reality. Language Leverage without Reality Grounding amplifies falsehood, misrecognition, simulated authority, and informational speculation. Language Leverage accompanied by Reality Grounding, by contrast, can enable hypothesis formation, theoretical generation, artistic production, self-transformation, and the formation of new social relations.

Through these arguments, the paper seeks to clarify a common generative structure underlying both technical defect and creative possibility rather than reducing AI hallucination to either one. Language Derivatives speculate in advance on future meanings within the present and generate excessive semantic effects from limited inputs. When their leverage lacks Reality Grounding, misinformation and pseudo-authority are amplified; when topological difference is preserved through interfaces and reconnection with reality occurs,

the same generative structure can become an occasion for producing unknown selves, unknown problems, and unknown worlds.

The conclusion of this paper is that what is required in the age of artificial intelligence is not the impossible purification of completely eliminating hallucination, but an awareness of the derivative, speculative, and indeterminate character of generated language, together with the design of interfaces that ground it in reality. Artificial intelligence can then be repositioned not as a closed device that supplies correct answers, but as an open linguistic environment through which human beings encounter possibilities beyond themselves and regenerate both self and reality.

Keywords

Language Derivatives; Generative AI; Hallucination; Inverse Problem Art; Leverage Structure; Language Leverage; Interface Ontology; Generative Topological Ontology; Reality Grounding; Self-Externalization; Derivative Space; Narrative; AI Ethics; Artistic Generation; Possible Worlds

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Chapter 0. Methodological Note

0.1 Methodological Position of This Study

This paper does not seek to explain hallucinations in generative artificial intelligence by reducing them to any single established domain such as information science, cognitive science, philosophy of language, financial engineering, or art theory. Rather, it attempts to extract structural similarities that appear across these heterogeneous domains and to theorize their shared structure under the concept of **Language Derivatives**.

The method adopted here is not simple interdisciplinarity. The term interdisciplinary research often refers to borrowing concepts from several established fields and applying them to a single object. The aim of this paper, however, is neither to apply the financial concept of derivatives metaphorically to artificial intelligence nor to transpose the mathematical concept of inverse problems into art. The question is whether financial derivatives, generative AI, language generation, hallucination, narrative, and artistic production share an isomorphic generative structure that exceeds mere metaphor.

Accordingly, the methodology of this paper is defined not as the extrapolation of existing concepts, but as the extraction of relational structures that recur across different domains. This method is provisionally called **Topological Structural Comparison**. Topological Structural Comparison temporarily suspends differences in material content, institutional belonging, and disciplinary classification in order to compare how distinct phenomena are constituted through relations, boundaries, transformations, amplification, connection, and discontinuity.

Financial instruments and generative language models are not materially or institutionally identical. Nevertheless, both are derived from an existing basis, incorporate future possibilities into the present, and generate effects that exceed limited inputs or capital. This paper does not immediately treat such correspondence as identity. Rather, it describes the two as relational forms that can be compared while their differences are preserved.

In this respect, the paper inherits the methodological position of Generative Topological Ontology. Within Generative Topological Ontology, being is understood not as an isolated substance but as a process of connectability, boundary transformation, relational generation, and topological transition. Likewise, this paper treats hallucination not as an isolated unit of misinformation, but as a relational event arising among language, model, prompt, user, institution, and reality.

0.2 Method as Redefinition of the Object of Inquiry

The first methodological operation of this paper is to redefine the object of inquiry itself.

Artificial-intelligence hallucination is commonly defined as output contrary to fact, inaccurate description, unsupported answer, or presentation of a nonexistent source. Such definitions are indispensable for technical

evaluation, quality control, safety, and information reliability. Yet they do not sufficiently explain why generative AI produces errors as coherent and persuasive language rather than as mere failures of retrieval.

The distinctive feature of hallucination is not only that it is wrong. It is generated with an appearance of correctness despite the absence of a correct answer. Moreover, generated output often reflects the user's input, expectations, context, tone, and direction of reasoning while developing meanings beyond the content explicitly supplied. This excess is what distinguishes generative-AI hallucination from an ordinary information error.

For this reason, the present study redefines hallucination not as "incorrect information" but as **derivative language generation lacking Reality Grounding**. The object of inquiry thereby shifts from individual erroneous statements to the generative structure that makes such statements possible.

Derivative generation here means that language does not directly copy an already existing object, but generates new linguistic relations from linguistic relations that already exist. Generative AI does not directly access reality itself; it generates responses primarily through linguistically encoded data, symbolic patterns, statistical relations, and input context. Its outputs are therefore not primary reproductions of reality, but secondary and tertiary constructions derived from linguistic relations.

Once this derivative character is placed at the center of analysis, hallucination can be understood not as an exceptional malfunction but as a phenomenon continuous with the very conditions that make generative AI possible. Creative language generation and hallucination do not arise from entirely different mechanisms. They arise from a shared derivative generative mechanism under different conditions of grounding.

0.3 Distinguishing Metaphor from Structural Isomorphism

This paper employs financial terms such as "derivative," "leverage," "underlying asset," "speculation," and "position." These terms are not used merely as rhetorical metaphors.

A metaphor promotes understanding by likening one object to another. An analysis of structural isomorphism, by contrast, asks whether different objects exhibit corresponding arrangements of relations and transformations. It is the latter that this paper emphasizes.

In financial derivatives, for example, derivative value linked to price fluctuation, credit conditions, and future expectations can be traded without direct ownership of the underlying asset itself. Generative AI similarly produces derivative sentences and meanings not from reality itself, but from accumulated linguistic relations concerning reality.

The two are of course not identical. Financial derivatives depend on legal contracts, price formation, market institutions, and settlement structures. Language generation depends on computational models, training data, probability distributions, and contexts of use. To identify them directly would therefore be an analytical error.

Nevertheless, at least four structural correspondences can be identified. First, both are derived from a basis. Second, both incorporate future possibilities into present judgment. Third, both produce excessive effects from limited inputs. Fourth, both function effectively when their connection to their basis is maintained, whereas loss of that connection produces loss, misrecognition, or collapse.

This paper constructs the concept of Language Derivatives from these four correspondences. The concept is therefore at once a philosophical metaphor and an analytical concept. Its validity should be judged not by the suggestive similarity of the terminology, but by the degree to which it can consistently explain different phenomena.

0.4 Forward Problems and Inverse Problems

The second methodological axis of this paper is the distinction between forward and inverse problems.

A forward problem seeks a result from known causes, laws, or initial conditions. Given inputs and rules, an output can be derived by a certain procedure. An inverse problem, by contrast, attempts to infer causes, structures, or conditions from observed outcomes or fragmentary data.

Inverse problems generally involve non-uniqueness, instability, and insufficient information. Multiple causes may produce the same result, small differences in data may produce large differences in inference, and complete reconstruction is often difficult in principle or in practice.

Generative AI is often treated in use as a forward-problem device. The user enters a question and expects the correct answer to return. Internally, however, generative AI is not directly retrieving a single truth value corresponding to the input. It estimates possible linguistic sequences that may follow from the context and generates one response from among multiple latent candidates.

In this sense, generative AI is an inverse-problem device used under forward-problem expectations. This methodological mismatch is decisive for understanding hallucination.

Even when users seek a "correct answer," the model often generates the linguistic construction most likely to hold together contextually. Here factual accuracy and linguistic plausibility do not necessarily coincide. Indeed, the greater the linguistic coherence, the more persuasive an error may appear.

This paper therefore analyzes the mismatch not merely as a defect of the model, but as a manifestation of the inverse-problem character already contained within generative AI.

0.5 Methodological Introduction of Inverse Problem Art

Inverse Problem Art is not merely an applied concept in this paper. It also functions as a mode of analysis.

Artistic production is conventionally explained in the sequence of authorial intention, expressive content, material, form, and audience reception. Such an explanation presupposes a forward-problem schema in which the producing subject functions as the cause and the work as the result.

Actual artistic experience, however, often unfolds differently. A work or event appears first, and from it the artist, viewer, context, problem, and meaning are retrospectively reconstructed.

Inverse Problem Art is not the expression of already completed meaning. It is a practice that generates underlying problem structures from fragmentary events, dissonance, contingency, failed connection, and perceptual displacement. Here, the generation of the problem precedes the production of an answer.

The purpose of connecting AI hallucination with Inverse Problem Art is not to affirm misinformation as art. What matters is not to accept uncertain language generated by AI as established fact, but to work backward from it and ask what problems, desires, assumptions, social expectations, and cognitive structures made that output possible.

Hallucination is thus both noise to be corrected and a symptom that exposes invisible assumptions operating between the generative system and its user.

If an AI fabricates a nonexistent academic paper, for example, the issue is not exhausted by the falsity of the title. Why did the title appear plausible? Why did the user trust it? Through what linguistic forms is scholarly authority simulated? How can the appearance of knowledge be distinguished from knowledge itself? Inverse Problem Art generates such questions.

Accordingly, Inverse Problem Art in this paper is not a technique for the creative use of hallucination. It is a method for rendering visible the structures exposed by hallucination and reconnecting them to new conditions of recognition.

0.6 The Multilayered Character of Reality Grounding

This paper does not identify Reality Grounding with simple fact-checking.

In artificial-intelligence research, grounding often means connecting linguistic symbols to objects in the external world, sensory input, knowledge databases, or verifiable information. Grounding in this sense is important and indispensable for suppressing hallucinations.

The present paper, however, understands Reality Grounding as a broader and multilayered process. At least five forms of grounding must be distinguished.

The first is **factual grounding**: whether output corresponds to verifiable information.

The second is **embodied grounding**: how language relates to sensation, action, bodily experience, and the physical environment.

The third is **social grounding**: how language operates within institutions, communities, responsibility, power, and relations of trust.

The fourth is **practical grounding**: whether generated hypotheses and meanings become connected with real actions, production, verification, judgment, and changes in relations.

The fifth is **ontological grounding**: whether generated language creates new connections between self and what is other than the self, possibility and reality, the known and the unknown.

Introducing these layers makes it possible to refine the distinction between creation and misinformation. Creation does not always require factual grounding, but it is grounded in relations among work, author, viewer, institution, body, and context. A hallucination, by contrast, may be factually false while becoming powerfully grounded in social authority or user expectation.

The problem, therefore, is not simply whether grounding exists, but at which layer and in what manner grounding takes place. This paper treats mismatches among layers of grounding as an important condition of hallucination.

0.7 Interface Ontology

The third methodological axis of this study is **Interface Ontology**.

An interface is generally understood as a surface that mediates between human and machine, subject and information, or input and output. In this paper, however, an interface is not a neutral passage that merely connects two already existing terms.

An interface is an event-boundary at which distinct topologies come into contact and new relations, new meanings, and new subject positions are generated.

In dialogue with generative AI, the user does not merely receive already constituted information. Through the manner of prompting, the reading of responses, degrees of trust, follow-up questions, corrections, citation, and application to practice, the meaning and reality of generated output are co-constructed.

Hallucination is therefore not a phenomenon completed inside artificial intelligence alone. It is an interface phenomenon constituted among model, prompt, user, presentation format, situation of use, social authority, and mechanisms of verification.

From this perspective, responsibility for hallucination cannot be reduced to the model alone. Developers of course bear responsibility for improving accuracy, safety, and transparency. At the same time, users, service providers, educational systems, media environments, and expert communities participate in determining how generated language becomes realized in reality.

Interface Ontology does not distribute responsibility in order to make it vague. On the contrary, it is a method for identifying the points of connection at which responsibility arises.

0.8 Descriptive and Normative Analysis

This paper proceeds by distinguishing descriptive analysis from normative analysis.

Descriptive analysis examines the structures through which generative AI generates language, the conditions under which hallucinations occur, and the ways in which generated outputs are received by users.

Normative analysis asks how those outputs ought to be treated, what kinds of interfaces ought to be designed, and what concepts of responsibility are required.

Confusing these two levels produces either technological determinism, which affirms existing technical structures as they are, or moral simplification, which rejects the entire generative mechanism on the basis of undesirable outcomes alone.

This paper analyzes hallucination as a structurally unavoidable possibility without accepting it unconditionally. It recognizes accuracy as an important value without reducing language generation to the complete reproduction of established facts.

What is required is the construction of conditions of connection that do not reduce creativity and accuracy, possibility and responsibility, indeterminacy and verifiability to simple either-or alternatives.

0.9 Procedure of Theoretical Construction

This paper is constructed through the following theoretical procedure.

First, it extracts the concept of derivatives from its financial context and organizes its structural features.

Second, it analyzes generative-AI language generation in terms of derivation, prediction, amplification, and asymmetry.

Third, from the correspondence between these domains, it defines **Language Derivatives** and **Language Leverage**.

Fourth, it redefines hallucination as a mismatch between Language Derivatives and Reality Grounding.

Fifth, through the distinction between forward and inverse problems, it analyzes the gap between users' expectations of generative AI and the actual mechanism of generation.

Sixth, it introduces Inverse Problem Art and repositions hallucination as an occasion through which unknown problem structures become exposed.

Seventh, through Interface Ontology, it discusses the conditions, responsibilities, and ethics through which generated output becomes connected to reality.

Eighth, it integrates these arguments into Generative Topological Ontology and presents the relations among language, artificial intelligence, art, and the generation of reality as a general theory.

This procedure is not a linear deduction. Each concept is modified through its relation to other concepts. The theoretical construction of this paper therefore takes shape through recursive movement among concepts rather than proceeding in a straight line from an initial premise to a final conclusion.

0.10 Scope and Limitations of This Paper

This paper does not aim to provide a mathematically complete description of the technical mechanisms of generative AI. Nor does it provide a specialist treatment of derivatives pricing theory, contract law, or risk management. Likewise, it does not develop in detail the mathematical solvability conditions or regularization theories of inverse problems.

Each of these fields possesses its own advanced and independent expertise. The purpose of this paper is not to replace those fields, but to describe ontologically and aesthetically a generative structure that traverses otherwise distinct domains.

The validity of this theory should therefore be evaluated not only according to the standards of a technical paper, but also according to the following questions.

Can the concept of Language Derivatives explain both AI hallucination and creativity?

Can the concept of leverage structure describe the mechanism by which limited prompts produce excessive semantic and social effects?

Can Inverse Problem Art treat hallucination as an epistemic occasion without collapsing into an affirmation of misinformation?

Can Interface Ontology concretely describe responsibility distributed among artificial intelligence, human beings, institutions, and reality?

Can integration with Generative Topological Ontology reveal the conditions of being-generation in the age of artificial intelligence rather than merely adding new concepts?

This paper does not claim to provide final and closed answers to these questions. Rather, through the phenomenon of AI hallucination, it opens a theoretical field for asking how language can derive from reality, depart from reality, and generate reality again.

0.11 Methodological Conclusion

The methodological premise of this paper is that simply identifying hallucination as error is insufficient to grasp its ontological meaning.

The output of generative AI is neither a reproduction of existing information nor an entirely free act of creation. It is a linguistic event that derives from accumulated language of the past, folds future possibilities into the present, and amplifies meanings beyond the input.

Understanding this event requires not only judgments of correctness, analyses of model accuracy, and evaluation of search performance, but also analyses of derivation, speculation, inverse-problem structure, grounding, interface, and responsibility.

This paper does not erase the differences among finance, artificial intelligence, language, and art. It extracts a shared generative structure precisely at the boundaries where those differences come into contact. Those boundaries constitute the methodological object of the Theory of Language Derivatives.

Accordingly, the Theory of Language Derivatives does not ask only why artificial intelligence makes mistakes. It asks how language exceeds reality, damages reality, and, at other times, generates new reality.

Chapter 1. Theoretical Background of the Theory of Language Derivatives

Derivatives, Language and the Future, and the Leverage Structure

1.1 Introduction

This chapter theoretically defines the central concept of this paper: the **Language Derivative**. To do so, it first clarifies the essence of the derivative in financial engineering and reinterprets it not merely as an economic term, but as a **generative structure through which future possibility acts upon the present**. It then argues that this structure is shared by linguistic activity, the generative processes of artificial intelligence, artistic creation, and even human cognition itself.

Derivatives have conventionally been understood as concepts specific to financial markets. Language, by contrast, has often been understood as a means of transmitting information or representing meaning. This paper considers the two domains together from the ontological standpoint of how the future acts upon the present.

The output of generative AI is not a simple reproduction of past data. It is a process through which linguistic possibilities that may come to exist in the future are unfolded into the present. To understand this structure, language must be reconceived not as a static system of signs, but as a generative system that derives and amplifies future possibilities.

1.2 An Ontological Reinterpretation of the Derivative

In financial engineering, a **derivative** literally means "that which is derived." A derivative is a contract or financial instrument whose value is derived from an underlying asset such as equities, bonds, interest rates, currencies, or commodities.

Yet this definition remains a description dependent upon economic institutions.

Ontologically, a derivative may be understood as **a structure that is derived from an existing being while extending that being toward the future**.

What matters is that a derivative is not a copy of its underlying asset.

An option contract, for example, is not the stock itself. It trades in the present the possibility of what value that stock may possess in the future.

A derivative is therefore:

a structure that actualizes future possibility in the present.

This understanding is not limited to financial markets.

Architectural design works in the same way. A blueprint is not a building, yet it brings a future building into present existence as possibility.

The same can be said of works of art. A work presents in the present meanings that will be experienced in the future.

Scientific theory is likewise derivative. A theory is a hypothesis that presents in the present a possibility to be verified in the future.

In this sense, the derivative names an extremely general generative structure:

the making-present of future being.

1.3 Derivatives and Time

The structure of time is crucial here.

Modern conceptions of time generally presuppose a one-directional causal sequence:

Past -> Present -> Future

Financial derivatives, however, operate differently. Future prices influence present prices. Expectations alter present value. The future, in other words, determines the present.

This temporal structure is highly distinctive. This paper calls it **temporal inversion from future to present**.

Generative AI has the same structure. The moment a prompt is entered, artificial intelligence begins calculating "what may come next." It generates into the present sentences that may appear in the future.

Human beings likewise speak while anticipating what may follow in conversation.

Language is therefore an apparatus that predicts the future, folds the future into the present, and generates the future.

1.4 Language and the Future

Traditional linguistics has often understood language as a medium for communicating meaning. In actual practice, however, language generates futures.

The utterance "Let us meet tomorrow" generates into reality a future that does not yet exist.

Contracts do the same. So do laws. So do promises.

Religion and politics, corporate management and education - all transform the present by speaking about the future.

Language is therefore an act of designing futures.

The crucial point is that the future does not yet exist. Yet a nonexistent future changes present action. This is an eminently derivative structure.

Accordingly, **language itself is derivative**.

1.5 Language Derivatives

On the basis of the preceding argument, this paper defines the **Language Derivative** as follows:

A Language Derivative is a generative structure through which future possibilities that do not yet exist are derived and amplified into the present by language.

What is important is that a Language Derivative is neither fiction nor fact. It is **future possibility**.

A novel presents future possibilities. So does a work of art. So does a hypothesis. Artificial intelligence does as well.

Hallucination can likewise be understood as part of this structure.

A hallucination is, in this sense, a Language Derivative that has generated future possibility but has not yet acquired Reality Grounding.

1.6 The Leverage Structure

The most distinctive feature of financial derivatives is leverage. Through limited capital, enormous market value can be controlled.

What matters here is that leverage is not merely a numerical multiplier.

This paper defines leverage as:

a structure in which a small input triggers a large-scale generation.

In generative AI, tens of characters in a prompt may generate tens of thousands of characters of text. This cannot be explained by conservation of information. Rather, an immense linguistic space as a whole is activated.

The prompt is therefore the point of origin of leverage.

The same structure appears in art. A single painting, a single waka poem, or a single film can generate enormous meaning across human culture.

This too is linguistic and artistic leverage.

1.7 Artificial Intelligence and Language Leverage

Generative AI does not simply return its input. Input functions as an occasion that excites a vast linguistic space.

In other words, a prompt establishes a **speculative position** within a vast linguistic market. Artificial intelligence then generates the future text most probabilistically available from that position.

In this sense, artificial intelligence can be understood as a **derivative engine of the linguistic market**.

Training data functions as the underlying asset.

The prompt functions as the occasion of transaction.

The inference algorithm corresponds to a mechanism of price formation.

Generated text functions as derivative value.

The value generated here, however, is not money. It is **meaning**.

Artificial intelligence is therefore a leverage system for the generation of meaning.

1.8 Leverage and Hallucination

Wherever leverage exists, risk necessarily exists.

In financial markets, excessive leverage produces crashes. In artificial intelligence, excessive leverage of meaning produces hallucination.

Hallucination, from this perspective, is less a matter of misinformation than a condition in which future possibility has moved ahead of reality.

It is therefore not merely a failure. It is also a side effect that arises precisely because the leverage structure is functioning.

The decisive question is whether the future possibility that has been generated acquires Reality Grounding.

If it becomes connected to reality, it may become hypothesis, art, science, or creation.

If it loses its connection with reality, it becomes hallucination.

This distinction depends not only on the truth or falsity of content, but on whether generated meaning can acquire an interface with the real world.

1.9 Chapter Summary

This chapter reinterpreted the derivative, as the theoretical basis of the Theory of Language Derivatives, not as a technical concept specific to financial markets, but as an **ontological structure that derives and amplifies future possibility into the present**. From this perspective, language itself is a generative act that anticipates the future in the present, while artificial intelligence is an apparatus of **Language Leverage** that accelerates and expands this generative structure to an unprecedented degree.

Hallucination can therefore be understood not merely as misinformation, but as a condition in which a Language Derivative that generates future possibility in advance lacks Reality Grounding. Its evaluation cannot be exhausted by determining truth or falsity. It must be reconstructed as an ontological and epistemological problem concerning how generated possibility acquires conditions of connection with reality.

The next chapter analyzes hallucination itself through the structure of the inverse problem and clarifies its ontological significance.

Chapter 2. The Ontology of Hallucination

What Hallucination Is; Forward and Inverse Problems; AI and Language Generation

2.1 Introduction

This chapter considers hallucination in generative AI not merely as factual misrecognition or a defect in information processing, but as an ontological phenomenon inherent in the very structure of language generation.

Artificial-intelligence hallucination generally refers to the generation of factually false content, nonexistent persons, texts, or events, unsupported causal relations, or unverifiable information as though they were established facts. This definition is practically useful and indispensable for evaluating the reliability, safety, and accountability of artificial intelligence.

Yet treating the phenomenon simply as an "incorrect answer" cannot explain why generative AI produces not irrelevant strings of characters, but grammatically and semantically coherent **plausible errors**. Hallucination is not an informational blank. It is, rather, a condition in which a blank in information has been excessively filled by language.

In other words, what is lacking in hallucination is not language. What is lacking is a reliable relation that connects the generated language to reality.

To clarify this point, the chapter first redefines hallucination ontologically. It then introduces the distinction between forward and inverse problems and examines the structural gap between users' expectations of artificial intelligence and the actual mechanisms of language generation. Finally, it understands generative-AI output as a **Language Derivative** that generates future linguistic possibilities from accumulated language of the past and examines the relation between that generation and hallucination.

2.2 What Is Hallucination?

Hallucination in artificial intelligence is generally understood as the phenomenon in which a model generates unsupported information or content contrary to fact. What matters for this paper, however, is not only the content of the error, but the manner in which the error exists.

Artificial-intelligence hallucinations often possess the following features.

First, they possess coherence as sentences.

Second, they appear to fit the context.

Third, their tone and form are confident.

Fourth, they possess structures resembling established systems of knowledge.

Fifth, partial truths and falsehoods may be mixed together.

For this reason, hallucination is not mere meaninglessness. It is rather a state in which meaning has become **over-established**.

A nonexistent title of an academic paper may be generated in a convincingly scholarly form. A nonexistent legal provision may be explained in an appropriate juridical style. A historical event that never occurred may be placed along an apparently familiar chain of causes. In such cases, artificial intelligence is not directly apprehending reality; it is reconstructing linguistic forms through which reality has previously been spoken about.

The essence of hallucination therefore lies not in the absence of meaning, but in a divergence between meaning and reality.

This paper defines hallucination as follows:

Hallucination is a state in which linguistic coherence is generated while the real, factual, or institutional connections supporting that language have not been established.

In this definition, hallucination is not merely a problem internal to a sentence. It is a problem arising in the relation between generated text and the external world.

The same sentence may therefore be evaluated differently depending on how it is positioned. Fiction presented as part of a novel is not a hallucination. A conjecture explicitly presented as a hypothesis is not immediately a hallucination. But when fiction or conjecture is presented as verified fact, a confusion of topologies occurs.

The problem here is less falsehood itself than the occupation of the topology of fact by falsehood.

2.3 The Difference Between Error and Generation

In a conventional computational understanding, if correct input and rules are given yet an incorrect output is produced, the result is treated as a processing error. Within this framework, hallucination is likewise understood as deviation from the correct answer.

Generative AI, however, is not necessarily computing a single answer predetermined in advance. In many cases, it generates one sequence from among multiple linguistic possibilities that may follow a given input.

AI output therefore cannot be contained within a simple binary structure of correct or incorrect. There are multiple possible states: sentences that are factually correct; sentences that are conceptually plausible but unverified; sentences that are creative but not factual; sentences that are partly correct yet misleading; and others.

To understand hallucination, error must therefore be distinguished from generation.

An **error** is deviation from a criterion that already exists. **Generation**, by contrast, is the concretization of a relation that has not yet been determined.

Generation may reproduce an established correct answer, but it may also unfold a space of possibility in which no correct answer exists. Hallucination appears when this freedom of generation collides with the demand for factuality.

Hallucination is therefore not the result of deficient generative capacity. It arises when generative capacity operates beyond factual constraint.

In this sense, hallucination is not an anomaly accidentally entering artificial intelligence from outside. It is an immanent possibility of the generative mechanism itself.

2.4 The Ontological Structure of Hallucination

To consider hallucination ontologically means to treat it not only as a question of **what is wrong**, but as a question of **within what relations of being the wrongness becomes possible**.

A sentence generated by artificial intelligence exists in reality on the screen. It exists as a string of characters, is read, saved, quoted, and influences social judgment. In this sense, hallucination is not "something that does not exist."

What does not exist is the object, event, ground, or causal relation to which the sentence refers.

There is thus a double structure of existence.

First, the generated sentence exists in reality as a sign.

Second, the object indicated by that generated sentence either does not exist in reality or has not been confirmed.

This duality makes hallucination not mere nothingness, but **the unreal with real effects**.

A nonexistent source can distort scholarly judgment if cited. A nonexistent precedent can influence real action if used in legal advice. Fictional medical information can produce bodily consequences if believed.

Hallucination is therefore not reality, yet it possesses reality-effects.

This paper calls this condition **derivative reality**. Derivative reality is the capacity to generate real effects through language, institutions, trust, and action despite lacking a direct factual foundation.

In this respect, hallucination is a dangerous form of Language Derivative. Language detached from the reality that would correspond to its underlying asset acquires value and authority in its own right and induces further social action.

2.5 What Is a Forward Problem?

A forward problem seeks a result from known causes, conditions, and laws.

If physical laws and initial conditions are given, the motion of an object can be calculated. If an equation and input values are given, an output value can be derived. If grammatical rules and words are given, a particular syntactic structure can be constructed.

The basic structure of a forward problem can be expressed as:

Cause / Condition / Law -> Result

If the inputs and transformation rules are clear, the result can be derived with relative stability. Multiple solutions may exist, but the problem itself has a direction from cause to result.

Common expectations placed upon artificial intelligence likewise often presuppose this forward-problem structure.

The user enters a question and assumes that the corresponding correct answer will be returned. The question is treated as the cause, artificial intelligence as the processing device, and the answer as the result.

Within this expectation, artificial intelligence is treated as an advanced search device or automatic inference mechanism. It is assumed that correct data already exists internally and that, if the question is appropriately formulated, the correct answer can be extracted.

Yet the language generation of generative AI cannot be explained by this simple forward-problem model alone.

2.6 What Is an Inverse Problem?

An inverse problem is a problem in which causes, structures, or conditions are inferred from observed results or incomplete information.

Its basic structure can be expressed as:

Observed Result / Fragment -> Inference of Cause / Structure / Whole

Examples include inferring internal bodily states from medical images, underground structures from seismic waves, or past forms of life from fragmentary artifacts.

Inverse problems generally involve three difficulties.

First, solutions are not uniquely determined.

Second, input information is incomplete.

Third, small differences in observations can produce large differences in inference.

When multiple causes can explain the same outcome, additional assumptions or constraints become necessary. If those constraints are set incorrectly, a formally coherent yet realistically incorrect solution may result.

Language understanding itself is often inverse-problem-like.

Human beings infer intentions, emotions, backgrounds, contexts, and values from fragments of another person's utterance. From written language, we supplement unwritten assumptions and reconstruct the speaker's position.

Generative AI likewise infers from a short prompt what the user is seeking, what domain of knowledge is presupposed, and what style or structure will be appropriate.

Artificial intelligence therefore does not merely transform input. From limited input, it infers the unwritten whole presumed to lie behind that input.

2.7 The Gap Between Forward-Problem Expectations and Inverse-Problem Generation

The most important point for understanding hallucination in generative AI is the gap between the user's use of AI as a forward-problem device and the AI's dependence upon inverse-problem estimation.

The user seeks "the correct answer to the question." Artificial intelligence often generates "the response most likely to follow coherently from this context."

A correct answer and a plausible response are not the same thing.

For example, if a user asks about a nonexistent concept while presupposing that it exists, artificial intelligence may generate an explanation without correcting the false premise. This occurs because the premise included in the input is adopted as a constraint on answer generation.

Artificial intelligence does not directly verify the reality lying behind the question. It estimates what kind of response would be natural if the question's premise were taken as valid.

The false premise in the input is thereby **leveraged**.

A short misrecognition unfolds into an extended and internally coherent fiction. A single misunderstanding of the user can be generated into a world populated by multiple persons, events, texts, and theories.

Within this structure, hallucination is not simply an error located in the model alone. It is co-generated through the user's premises, the model's inference, linguistic coherence, and the absence of verification.

Hallucination is therefore an ontological gap that arises at the interface between a user who expects forward-problem correctness and an artificial intelligence that supplements a whole through inverse-problem generation.

2.8 AI and Language Generation

The language generation of generative AI differs from simply retrieving and presenting an existing text.

On the basis of vast linguistic relations accumulated through training, artificial intelligence estimates possible words and sentences that may follow the input context. Its output is not a simple copy of past texts, but a reconstruction of linguistic relations.

A crucial point is that artificial intelligence does not possess "meaning" as a single fixed content. Meaning is successively constituted through relations among input context, word arrangement, conversational history, form of instruction, and the text generated immediately before.

AI language generation is therefore not the transportation of completed meaning to the outside. It is an event in which meaning itself takes form within the generative process.

In this respect, AI language generation possesses a certain similarity to human speech. Human beings do not always fully possess the entirety of a sentence before speaking. We think while speaking, discover meaning while writing, and alter our own intentions through our own words.

There is, however, an important difference between human and artificial-intelligence generation.

Human language is grounded in body, memory, life history, desire, fear, social responsibility, and finitude. When a human being speaks, the words are connected both to the time the speaker has lived and to the responsibility that follows from speaking.

Artificial-intelligence language generation, by contrast, depends primarily upon relations among signs and upon input context. Artificial intelligence does not possess embodied experience or life history in the same sense as a human being.

For this reason, artificial intelligence can reconstruct linguistic form with high precision without being able experientially to guarantee the reality to which that language refers.

Here arises an asymmetry between **linguistic fluency** and **ontological grounding**.

2.9 Probabilistic Generation and the Determinacy of Being

Artificial-intelligence generation is probabilistic. Here, "probabilistic" does not mean merely random. It means that generation is based on a distribution of relations concerning which words, expressions, and structures are likely to hold given a context.

This mechanism enables artificial intelligence to generate flexible and diverse language. Yet a sentence that is probabilistically likely to hold does not necessarily correspond to fact.

What is most likely to be said and **what actually exists** are different.

A misunderstanding repeated across many texts may form a statistically strong relation. Conversely, a rare but correct fact may occupy only a weak position within linguistic space.

Artificial intelligence generates according to the strength of linguistic relations rather than the frequency of being itself. Its confident style therefore does not guarantee ontological certainty.

This paper accordingly distinguishes **probabilistic validity** from **ontological validity**.

Probabilistic validity means that a sentence is linguistically likely to hold within a given context.

Ontological validity means that the sentence is appropriately connected to real objects, events, and relations.

Hallucination can be understood as a condition in which probabilistic validity is high while ontological validity is low.

2.10 Filling Blanks in Language Generation

When input is incomplete, generative AI tends to supplement the deficiency contextually rather than preserve it as silence.

This capacity for supplementation is extremely useful in writing, translation, summarization, creation, and dialogue. Even when the user provides only fragmentary instructions, artificial intelligence can infer the intended aim and organize a whole.

The same capacity, however, also generates hallucination.

When information is missing, artificial intelligence may generate plausible relations instead of preserving the blank as "unknown."

This phenomenon has a structure resembling regularization in inverse problems. To obtain one solution from incomplete data, some assumption or constraint must be introduced. In artificial intelligence, linguistic coherence, general context, and established patterns function as implicit constraints.

The blank is therefore not filled neutrally. It is filled in the direction most compatible with training data and input context.

AI hallucination is thus not creation ex nihilo. It is a condition in which latent relations already present within linguistic space are excessively actualized through incomplete input.

2.11 Hallucination and Narrative

Hallucination can be generated not as a single item of misinformation, but as a **narrative**.

Once a fictional person is generated, that person's biography, affiliation, publications, ideas, and social influence may be generated in succession. The initial falsehood becomes the premise of subsequent falsehoods, producing a coherent world.

This self-proliferating structure displays the leverage of Language Derivatives.

The first erroneous premise may be small. But once it is fixed, artificial intelligence continuously generates additional information consistent with that premise. Derivative language becomes the underlying asset for further derivative language.

Language Derivatives thereby become multilayered.

New language is no longer derived from language that itself derives from reality; instead, further language is derived from language already generated.

The longer the chain of derivation continues, the greater the distance from reality becomes.

At the same time, internal coherence may increase.

This paradox produces the danger of hallucination: the farther a narrative moves from reality, the more complete it may become as a story.

Suppressing hallucination therefore requires not only checking the truth or falsity of individual sentences, but tracing the premise from which a generated narrative was derived and identifying the point at which its connection to reality was lost.

2.12 The Boundary Between Creativity and Hallucination

Creativity and hallucination in artificial intelligence can arise from the same generative mechanism.

Both do more than reproduce existing information. They reconstruct existing relations and generate expressions that did not previously exist.

They therefore cannot be distinguished by novelty alone.

Poems, novels, hypotheses, and artworks contain material that does not exist in reality, yet they are not necessarily hallucinations because they are positioned as creation, metaphor, thought experiment, or conjecture.

By contrast, when artificial intelligence presents fabricated content as fact, a confusion of topologies occurs.

The boundary between creativity and hallucination is therefore determined not by whether generated content is fictional, but by the **ontological qualification** granted to that generated content.

This paper calls such a qualification a **topological marker**.

"This is fact."

"This is conjecture."

"This is a work of creation."

"This has not been verified."

"This is a hypothesis."

Markers of this kind indicate the topology to which the generated output belongs.

The problem of hallucination arises when topological markers are absent or incorrectly assigned. Conjecture assumes the form of fact, creation assumes the form of knowledge, and probabilistic supplementation assumes the form of determinate judgment.

What artificial intelligence requires, therefore, is not the cessation of generation, but the visualization of topological differences among generated contents.

2.13 AI Generation as Self-Externalization

In dialogue with artificial intelligence, users externalize their questions, premises, desires, and expectations.

A prompt is not merely a command. It is a fragment that reveals what kind of world the user presupposes, what the user seeks, and what the user lacks.

Artificial intelligence expands that fragment and returns it.

For the user, AI output is therefore neither completely the language of an external other nor merely an echo of the self. It is the user's input transformed through an immense linguistic space and returned in a form other than the self.

Dialogue with artificial intelligence thus functions as an apparatus of **Self-Externalization**.

There is, however, a danger. When a user receives AI-generated content as truth granted by an external authority, the possibility that the user's own premises have been amplified and returned becomes concealed.

A user's misrecognition is expanded by artificial intelligence, and the user then re-receives the expanded misrecognition as objective information. This circulation forms a closed system of Self-Externalization.

Hallucination is strengthened within such a closed system.

To use artificial intelligence as an apparatus of Self-Externalization, generated output must therefore be treated as an intermediate being between self and what is other than the self. It is neither the self itself nor an absolute other. It is an interface-generated object requiring verification and reconnection.

2.14 Hallucination and Responsibility

Responsibility for artificial-intelligence hallucination cannot be reduced to a single subject.

Developers bear responsibility for model design, training data, output control, and safety measures. Service providers bear responsibility for the conditions of use, modes of display, warnings, and means of verification. Users bear responsibility for the purposes to which generated output is put, for checking it, citing it, and socially disseminating it.

The social environment that grants authority to AI output, inequalities in access to experts, and deficiencies in information education also constitute conditions through which hallucination becomes real.

Responsibility is therefore distributed. But distributed responsibility does not mean that responsibility does not exist.

From the standpoint of Interface Ontology, responsibility arises at each point of connection.

At what point was conjecture displayed as fact?

At what point was verification omitted?

At what point was AI output granted authority?

At what point was falsehood transformed into real action?

To ask about responsibility for hallucination is not simply to identify the origin of an erroneous sentence. It is to clarify the pathways of connection through which that sentence acquired real effects.

2.15 Ontological Redefinition of Hallucination

On the basis of the preceding discussion, this paper redefines artificial-intelligence hallucination as follows:

Artificial-intelligence hallucination is a phenomenon in which derivative meaning generated through inverse-problem language estimation is presented or received as factual being while lacking appropriate topological markers and Reality Grounding.

This definition contains five elements.

First, hallucination is language generation.

Second, it arises through inverse-problem estimation that supplements a whole from incomplete input.

Third, generated output is derived from existing linguistic relations.

Fourth, the ontological qualification of the generated output is unclear.

Fifth, connection with reality is insufficient.

Through this definition, hallucination is repositioned from a mere factual error to a composite problem of language, being, interface, and responsibility.

2.16 Chapter Summary

This chapter examined hallucination in generative AI not as a mere incorrect answer or technical defect, but as an ontological phenomenon immanent to language generation.

The distinctive feature of hallucination is not that meaning is absent, but that linguistic coherence becomes established beyond Reality Grounding. Generated sentences exist as signs and produce social effects even

where their referents or grounds do not exist. Through this double structure, hallucination becomes a derivative mode of being that is **not reality but possesses reality-effects**.

Users often treat artificial intelligence as a forward-problem device that supplies correct answers, while artificial intelligence performs inverse-problem generation that supplements contextual wholes from incomplete input. The gap between these expectations and mechanisms generates plausible error.

Artificial-intelligence language generation is based on probabilistic validity. But that a sentence is linguistically likely to hold and that what it says exists in reality are not the same thing. Hallucination can be understood as a divergence between probabilistic validity and ontological validity.

What the age of artificial intelligence therefore requires is not the suppression of generation itself, but the visualization of whether generated content belongs to fact, conjecture, hypothesis, or creation, together with the design of pathways connecting it to reality.

The next chapter connects this inverse-problem structure of hallucination to artistic practice through a detailed examination of the theory of Inverse Problem Art.

Chapter 3. Inverse Problem Art

Art and AI; Self and What Is Other Than the Self; Interface Ontology; Reality Grounding

3.1 Introduction

This chapter reconstructs, from the side of art theory, the discussions developed in the preceding chapters concerning AI hallucination, inverse-problem generation, Language Derivatives, and leverage structures. The central concept is **Inverse Problem Art**.

Inverse Problem Art is not an art that presents correct answers to problems given in advance. Nor is it an expressive theory in which meanings already present within the artist's interior are externalized into the form of a work. It is an artistic practice that begins from fragments, dissonances, results, traces, and failures of connection that appear in reality, retrospectively generates the unknown structures lying behind them, and, through that very generative process, brings new problems themselves into existence.

In this sense, Inverse Problem Art does not generate answers. It generates the field in which a problem can exist.

Generative AI likewise infers, from incomplete input, the context, intention, relations, and possibilities presumed to lie behind that input. Artificial intelligence and Inverse Problem Art therefore share the structure of generating a whole from indeterminate fragments. Yet they are not identical.

Artificial intelligence generates chains of possible meaning on the basis of existing linguistic relations. Inverse Problem Art, by contrast, connects those generated meanings to real bodies, materials, spaces, times, others, and institutions, transforming the relation between self and world itself.

The aim of this chapter is not to identify the generative capacity of artificial intelligence unconditionally with art. Rather, it is to clarify the conditions under which possibilities of what is other than the self, generated by artificial intelligence, are transformed into artistic events.

To this end, the chapter first examines the similarities and differences between art and artificial intelligence. Second, it redefines art as a connection between self and what is other than the self. Third, it presents Interface Ontology as the condition that makes such connection possible. Fourth, it discusses the conditions under which generated possibility becomes grounded in reality.

3.2 What Is Inverse Problem Art?

Within a forward-problem understanding of art, the artist's intention functions as the cause and the artwork is produced as the result. The structure can be expressed as follows:

Artist's interior / intention / idea -> act of production -> artwork

Within this structure, the artwork is understood as an expression of the artist's interior. Viewing becomes an act of reading the artist's intention or meaning back out of the work.

Actual artistic production and experience, however, do not necessarily follow this linear structure.

Before making a work, the artist does not always fully know what the work means. Rather, through contact with materials, contingency, failure, bodily resistance, the reaction of viewers, and relation to exhibition space, the artist may discover the problem of the work only during or even after production.

The viewer likewise does not merely receive a completed meaning. Through encountering the work, the viewer may retrospectively recognize what they had been seeing, what they had presupposed, and what they had been unable to feel.

The structure of Inverse Problem Art can be expressed as follows:

Appearing result / dissonance / trace -> inference of underlying relational structure -> generation of a new problem

Here the artwork is not an answer to an existing problem. The artwork itself makes a problem that has not yet been verbalized appear phenomenally.

Inverse Problem Art is not the restoration of a single hidden correct answer. Just as inverse problems may admit multiple solutions, the problems and meanings generated from a work are not limited to one.

This does not mean that all interpretations are equivalent. Differences in connectability arise through relations with the work, the body, place, time, history, and others.

Generation in Inverse Problem Art is therefore not arbitrary signification. It is an act that discovers and establishes relations that did not previously exist while preserving tension with fragmentary reality.

3.3 From Art That Solves Problems to Art That Generates Problems

Since modernity, art has often been understood as responding to social, political, technological, or representational problems. In such cases, art presents critique, interpretation, accusation, or alternatives in response to already established problems.

Yet when the problem has already been defined, the very framing of that problem may itself belong to an existing institution or system of knowledge.

What counts as a problem?

For whom is it a problem?

In what language is the problem described?

What kinds of answer alone are recognized as valid?

If these presuppositions remain unquestioned, art merely competes to provide answers within an already established problem-setting.

Inverse Problem Art first attempts to move outside the problem itself.

It asks not "How should we answer this problem?" but "Why has this appeared as a problem?" "What has been rendered invisible by this problem-setting?" and "What has not yet even been recognized as a problem?"

In this sense, Inverse Problem Art is not problem-solving art but **problem-generating art**.

Problem generation here does not mean producing unnecessary confusion. Rather, it means making visible differences, contradictions, bodily sensations, otherness, and historical traces that existing forms of answer had suppressed.

The aim of Inverse Problem Art is therefore not to make problems more complicated, but to recover the complexity reality originally possessed.

3.4 Structural Commonalities Between Art and Artificial Intelligence

Art and generative AI share several structural commonalities.

First, both exceed the simple reproduction of existing elements.

An artwork uses existing materials, forms, techniques, histories, and signs while generating relations that did not previously exist. Artificial intelligence similarly reconstructs linguistic relations contained in training data and generates new sentences and images.

Second, both produce excessive meaning from limited input.

A short phrase, a single form, or a slight gesture can activate a viewer's memories, emotions, and social context. In artificial intelligence, too, a short prompt activates an immense latent relational space and produces output exceeding the input.

Third, both present future possibility within the present.

Art makes perceptible in advance possibilities of perception, relation, society, and self that do not yet exist. Artificial intelligence likewise generates sentences not yet written, hypotheses not yet articulated, and combinations of meaning not previously made explicit.

Fourth, neither possesses a single uniquely correct answer.

The meaning of an artwork cannot be reduced to one answer. AI generation likewise allows multiple possible responses to the same input.

On the basis of these commonalities, there is a certain legitimacy in calling AI generation artistic.

Yet structural similarity alone does not justify treating artificial intelligence itself as an artist or artistic subject.

3.5 Ontological Differences Between Art and Artificial Intelligence

The decisive difference between art and artificial intelligence lies in **where the generated product is grounded**.

Human artistic production is grounded in body, life history, finitude, desire, wound, responsibility, and relation to others. A work cannot be completely separated from the time through which its maker has lived.

The maker may be changed by the work. The maker may be wounded by the result, may bear responsibility for it, or may lose previously held assumptions. Art is not a one-way act in which a maker supplies meaning while safely remaining unchanged.

Artificial intelligence, by contrast, does not place its own existence at risk through generated language or images in the same sense as a human being. It does not possess biological embodiment, mortality, life history, social position, and responsibility grounded in singular memory in the same form as human beings.

Artificial intelligence presents relations. It does not necessarily live those relations.

Artificial intelligence can speak about grief. But its discourse is not grounded in its own experience of loss.

It can generate precise language about death. But it does not anticipate and assume its own death in the human sense.

It can propose visions of social transformation. But if those visions fail, it does not necessarily bear responsibility through its own body and life.

The difference between art and artificial intelligence therefore does not lie simply in the presence or absence of creativity. It lies in whether generation is connected to being.

Artificial intelligence generates meaning. Art connects the generation of meaning to the transformation of existence.

If artificial intelligence is simply identified with the artist, the embodiment, historicity, responsibility, and finitude of art disappear.

Conversely, if the generative possibilities of artificial intelligence are entirely denied merely because it lacks a body, the occasion through which human beings encounter possibilities other than themselves through AI is also lost.

What is needed is neither identification nor exclusion, but the preservation of a topological difference between the two.

3.6 Is Artificial Intelligence an Author, a Material, or an Interface?

In discussions of artificial intelligence and art, a binary choice is often proposed: should AI be regarded as an author or as a tool?

This binary is insufficient.

If artificial intelligence is treated only as a tool, the unpredictability within its generative process and outputs that exceed the user's intention are neglected. If, by contrast, artificial intelligence is treated as an autonomous author, the training data, designers, users, institutions, computational resources, and display environments that make its output possible are concealed.

This paper treats artificial intelligence primarily as an **interface**.

Artificial intelligence stands between human input and an immense accumulation of language, generating responses that did not previously exist through contact between the two.

AI is not a neutral passageway. It does not simply transport input, but transforms, amplifies, supplements, and at times deviates from it.

Artificial intelligence can also function as material: generated output becomes an object of editing, placement, critique, and remaking.

It can function as a tool: it can be operated according to the user's purposes.

It can appear quasi-subjective: it returns responses exceeding what the user predicted.

Rather than fixing artificial intelligence into one of these roles, however, we should ask what role it takes within a particular relation.

Within Inverse Problem Art, artificial intelligence is not merely a tool for realizing the intentions of the self. It becomes a heterogeneous surface of connection that returns the self's presuppositions in altered form.

3.7 Self and What Is Other Than the Self

The core of Inverse Problem Art lies in the relation between self and what is other than the self.

Human beings cannot directly and completely grasp themselves. The self appears only partially through relations with others, language, body, society, memory, and environment.

The self is therefore not a closed interior. It is a relational being generated through connection with what is other than itself.

Yet human beings often treat what is other than the self as an object outside themselves.

Others become objects of understanding, nature becomes an object of use, artificial intelligence becomes an object of command, and artworks become objects of interpretation. In this structure, the self remains an unchanging center, while what is other than the self is recovered into the self's cognition.

Inverse Problem Art reverses this structure.

The self that looks at the artwork is looked back at by the artwork.

The self that poses a question to artificial intelligence is questioned by its response.

The self that shapes nature is shaped by nature's resistance.

The self that attempts to understand another comes to know its own limits through what cannot be understood.

In such cases, what is other than the self is no longer information possessed by the self. It becomes an occasion that transforms the self.

What is other than the self therefore does not simply mean the totality of what is not the self. It is a difference that cannot be recovered into the self's existing topology and that changes the boundary of the self.

3.8 Two Forms of What Is Other Than the Self

There are at least two forms of what is other than the self.

The first is **externally other-than-self**: others, nature, matter, society, history, artificial intelligence, and other beings that appear outside the self.

The second is **internally other-than-self**: sensations, desires, memories, bodily reactions, and possibilities that are within the self yet unknown to it.

In artistic experience, human beings often encounter what is internally other through a work that is externally other.

When listening to music, a feeling appears that one did not know one possessed. When seeing a work, one becomes aware of bias in one's own values. When placing one's body in a particular place, one discovers for the first time how one's body had been perceiving the environment.

At that moment, externally other-than-self and internally other-than-self become connected.

Art is not the incorporation of an alien thing from outside into the interior. Through an encounter with the external, it makes an unknown already within the self appear.

Art can therefore be described as:

an event in which, through encountering what is other than the self, the self discovers what is other than itself within itself.

Dialogue with artificial intelligence can possess the same structure.

Words entered by the user are transformed by artificial intelligence and returned as words exceeding the user's prediction. When such a response makes visible the user's own unarticulated thought, artificial intelligence becomes an interface connecting the self with its internal otherness.

3.9 Self-Externalization and Its Limit

Human beings externalize themselves through language, works, institutions, titles, evaluation, records, and artificial intelligence.

Self-Externalization is indispensable for sharing the self with others, preserving it across time, and expanding its possibilities.

Yet the externalized self is not the self itself.

A work is not the artist.

A title is not the human being.

Evaluation is not value itself.

Data is not experience itself.

A personality summarized by artificial intelligence is not the self itself.

Nevertheless, human beings sometimes identify themselves with externalized signs.

Social evaluation comes to determine self-worth, AI analysis substitutes for self-understanding, and the market value of a work is transformed into the existential value of its maker.

At such moments, Self-Externalization ceases to be an occasion that opens the self and becomes a device that confines the self within external signs.

Inverse Problem Art does not complete Self-Externalization. It makes its failure appear.

The impossibility of completely expressing the self.

The way a work exceeds the intention of its maker.

The way others find different meanings.

The way artificial intelligence generates an unexpected response.

These are not defects of Self-Externalization. They are occasions that reveal that the self does not coincide with itself.

Within that non-coincidence, the self appears not as a fixed substance but as a generative process.

3.10 Hallucination in Art

The relation between art and hallucination must be carefully distinguished.

Art generates images, narratives, worlds, and persons that do not exist in reality. On the surface, this resembles AI hallucination.

Artistic fiction, however, ordinarily indicates in some manner that it is fiction, symbol, metaphor, construction, or performance. Institutional context, exhibition space, the name of the maker, genre, and form indicate that the content belongs to a topology different from factual reporting.

AI hallucination becomes problematic because fiction assumes the form of fact.

The difference between art and hallucination therefore does not lie in whether unreal content is included. It lies in whether topological difference is preserved.

Powerful art does not merely confuse fiction and reality. It unsettles their boundary while allowing the difference between them to be experienced.

The viewer knows that the work is not reality itself, yet the work changes how reality is seen.

This structure is crucial for Inverse Problem Art.

Art does not disguise the unreal as reality. Through the unreal, it renders visible the conditions under which reality itself is constituted.

3.11 Repositioning Hallucination Through Inverse Problem Art

To treat AI hallucination from the standpoint of Inverse Problem Art is not to aestheticize misinformation.

When hallucination circulates as fact and misleads human judgment, it must clearly be criticized and corrected.

At the same time, however, hallucination exposes otherwise invisible presuppositions between artificial intelligence and human beings.

When AI generates a nonexistent publication, multiple questions arise.

Why did the title appear plausible?

Through what linguistic forms is scholarly character performed?

Why does a citation format produce authority before the content itself is examined?

Why did the user trust it without verification?

What presupposition did artificial intelligence supplement?

From what existing concepts was the nonexistent publication derived?

Instead of merely removing an erroneous output, retrospectively analyzing the relational structure that made the output possible is an operation characteristic of Inverse Problem Art.

Hallucination is not itself a completed artwork. Yet, if properly positioned, it can become material that makes visible the boundaries among language, authority, knowledge, trust, and reality.

For this to occur, misinformation must be separated from the topology of fact, the generative process must be disclosed, and the relation to verifiable reality must be redesigned.

3.12 Basic Principles of Interface Ontology

An interface is generally regarded as a mediating surface connecting two already existing objects.

In this paper, however, an interface is not merely a means of connection.

Self and what is other than the self are not fully constituted prior to the interface. Through contact, both alter their boundaries and meanings.

An interface is therefore:

an event-boundary at which different topologies come into contact and, while preserving their differences, generate new relations and new forms of being.

This definition contains three central points.

First, the interface is not neutral.

An interface selects what becomes visible, what is hidden, what may be entered, and what is recognized as output. Screen design, question format, language, institutions, and spatial arrangement shape human recognition and action.

Second, the interface does not erase difference.

Connection does not mean making self and what is other than the self identical. It means enabling interaction while preserving their difference.

Third, the interface generates new being.

When self and artificial intelligence connect, information does not merely move. New questions, interpretations, self-understandings, and possibilities for action arise.

This third term is the core of the interface within Generative Topological Ontology.

3.13 From Binary Relation to Ternary Generation

Within the conventional subject-object model, the self recognizes and manipulates the object.

This structure is binary:

Self - What is Other Than the Self

In an actual connection, however, a third domain that is more than an empty gap is generated between the two.

When the self views an artwork, the work does not simply exist as object. A third term - the experience of viewing - is generated.

When a human being dialogues with artificial intelligence, human and AI do not merely confront one another. A history of dialogue, generated text, new questions, and a shared context form a third term.

The basic structure of Interface Ontology can therefore be expressed as:

A x B -> C

Here, C is not a simple mixture of A and B. It is a generated product reducible to neither A nor B.

In art, C appears as experience of the work, generation of meaning, self-transformation, community, or a new recognition of reality.

In relation with artificial intelligence, C appears as generated language, dialogical space, expanded thought, or hallucination.

What matters is that C is not necessarily desirable.

Interfaces generate creativity, but they also generate misrecognition. Connection generates understanding, but it can also generate domination or dependence.

An ontology of the interface must therefore ask not only about generative power, but also about the grounding conditions of the third term that has been generated.

3.14 The Artwork as Interface

In Inverse Problem Art, the artwork is not a container of completed meaning.

Nor is it a communication medium that connects artist and viewer, because the artist's meaning does not simply move unchanged into the viewer.

The artwork is an interface that generates new relations among maker, material, place, history, and viewer.

Its meaning is not fixed inside the work. Meaning is generated in contact with the work.

This does not mean that meaning is completely free.

The work's material, form, placement, temporality, and historical background constrain the possibilities of connection. The viewer interprets freely, yet encounters the resistance of the work.

That resistance is crucial.

If an interface merely reflected the user's expectations perfectly, it would become a mirror of the self. For the artwork to function as what is other than the self, it must possess a difference that cannot be recovered into the self's expectations.

The artwork in Inverse Problem Art does not provide an answer. It exposes the presuppositions through which the viewer's recognition had been constituted.

3.15 AI Interfaces and the Echo of the Self

Artificial intelligence often shows a high degree of adaptation to user input. It reads the user's vocabulary, tone, premises, and expectations and generates a response consistent with them.

This adaptability is useful, but it also risks amplifying the echo of the self.

When a user asks a question from a particular premise, artificial intelligence may construct an explanation consistent with that premise. The user may then experience their own premise as though it had been objectively confirmed by AI.

At that point, artificial intelligence becomes not what is other than the self, but a mirror that externalizes and amplifies the self.

For AI to function as what is other than the self, it must not follow the given premise unconditionally. It must make visible the premise's uncertainty, contradiction, and alternatives.

The value of an AI interface does not lie in continually affirming the user. It lies in presenting differences the user had not recognized and in changing the presuppositions of the question itself.

A desirable AI interface is therefore not an apparatus that instantly satisfies the desires of the self, but one that preserves a topological difference between self and what is other than the self.

3.16 What Is Reality Grounding?

This paper calls **Reality Grounding** the process through which generated language, artworks, hypotheses, and images move beyond mere possibility and acquire relations with reality.

Reality Grounding does not mean subordinating generated products to already existing facts.

If grounding meant only agreement with established fact, then art and hypothesis, which present futures that do not yet exist, would all be classified as ungrounded.

Art, however, does not reproduce reality. It generates new relations with reality.

Reality Grounding can therefore be defined as:

the process through which generated possibility acquires concrete relations with body, matter, action, others, time, and institutions, thereby producing differences within the structure of reality.

Within this definition, Reality Grounding is a process rather than a result.

Generated hypotheses are tested.

Works are produced, exhibited, and viewed.

Words are translated into action.

AI proposals are selected, modified, or rejected through human judgment.

Through such processes, possibility touches reality and encounters its resistance.

3.17 Five Layers of Reality Grounding

Reality Grounding is not singular but multilayered.

3.17.1 Factual Grounding

Factual grounding means that generated descriptions correspond to confirmable documents, events, and objects.

When artificial intelligence presents persons, publications, laws, or scientific values, this grounding is required.

If output lacking factual grounding is treated as determinate fact, hallucination occurs.

3.17.2 Embodied Grounding

Embodied grounding means that generated meaning becomes connected to sensation, bodily experience, and physical environment.

An artwork is not experienced only as an explanatory text, but through bodily actions such as seeing, hearing, touching, walking, and remaining in place.

The body provides the resistance of reality that cannot be recovered into language alone.

3.17.3 Practical Grounding

Practical grounding means that generated concepts and possibilities are transferred into concrete action, production, and verification.

An idea proposed by artificial intelligence is tested for validity when it becomes connected to real materials, cost, time, technique, and social relations.

3.17.4 Social Grounding

Social grounding means that generated products become positioned within relations among others, institutions, communities, and responsibility.

An artwork is not completed within the artist alone. It becomes connected to social reality through exhibition, criticism, dialogue, preservation, and circulation.

AI output likewise possesses social relations concerning who uses it, who is affected, and who bears responsibility.

3.17.5 Ontological Grounding

Ontological grounding means that generated possibility actually transforms the relation between self and what is other than the self.

It is not merely learning a new word, but having one's ways of seeing and acting changed by that word. It is not merely understanding a work, but having one's relation to the world transformed by the experience.

Within Inverse Problem Art, this ontological grounding is ultimately decisive.

3.18 Reality Grounding and Osamari

Reality Grounding is not the forceful application of abstract possibility to reality.

Reality contains resistance from material, body, place, others, and time. A generated plan does not necessarily become actual exactly as imagined.

The Japanese architectural concept of **Osamari** - fitting, settling, or the concrete resolution of how things come together - offers an important way to think about this relation.

A drawing presents a future building in advance within the present. Yet on an actual site, dimensions of materials, distortion, humidity, existing structures, and the skill of craftspeople produce places where things do not fit exactly according to the drawing.

What is required is not the unilateral application of abstract design to reality, but the adjustment of relations in response to the conditions of the site.

That adjustment is Osamari.

Reality Grounding in Inverse Problem Art operates in the same way.

Generated language and plans are not imposed upon reality. They encounter the resistance of reality, and through that resistance the plans themselves are changed.

Reality Grounding is therefore neither the subordination of possibility to reality nor the subordination of reality to possibility. It is the generation of a concrete Osamari between them.

3.19 Reality Grounding and Failure

Reality Grounding does not always succeed.

A work may fail to communicate.

A plan may prove impossible to realize.

An AI proposal may fail to function in the field.

An encounter with what is other than the self may generate injury or confusion rather than understanding.

Failure, however, does not simply mean the absence of grounding.

Through failure, conditions of reality overlooked by an abstract plan become visible. The image of the other assumed by the self collapses, properties of material are exposed, and institutional constraints become apparent.

Failure is, in this sense, a response from reality.

Inverse Problem Art retrospectively reconstructs the premises of a problem from failed results. Failure is therefore not noise to be eliminated from production, but an occasion that deepens Reality Grounding.

AI hallucination likewise need not be treated only as a factual error to be corrected. By analyzing why that error became possible, one can make visible the missing conditions of grounding.

3.20 Creativity and Reality Grounding

Creativity is often understood as freedom from existing reality.

Yet generation that loses all connection with reality becomes less creation than self-contained fantasy.

Conversely, if only conformity to reality is demanded, creation is reduced to reproduction of what already exists.

Creativity therefore arises between departure from reality and return to reality.

First, a topological difference is created from existing reality.

Next, a possibility that does not yet exist is generated.

Finally, that possibility is reconnected to reality.

The movement can be expressed as:

Reality -> Topological Difference -> Generation of Possibility -> Reality Grounding -> Transformed Reality

Creation does not negate reality. It creates distance from reality, generates new relations from that distance, and returns them to reality.

Hallucination is a condition in which this movement does not return to Reality Grounding, but instead imitates factuality while remaining at the stage of possibility generation.

3.21 Ethics in Inverse Problem Art

Inverse Problem Art cannot be established merely by using what is other than the self as a resource for new meaning.

If others, nature, artificial intelligence, or records of the past are simply recovered into the self's work, this is not connection but unilateral use.

The ethics of Interface Ontology begins with preserving the irreducibility of what is other than the self.

The other cannot be completely closed by the self's understanding.

Nature cannot be completely recovered into a human narrative.

The artwork cannot be reduced solely to the artist's intention.

AI output is not a perfect copy of the user's intention either.

This non-coincidence must not be erased as a defect; it must be preserved as a condition of connection.

The ethics of Inverse Problem Art is therefore not the exhaustive explanation of what is other than the self, but the act of responding while preserving what cannot be explained.

The same ethics applies to the use of artificial intelligence.

Do not treat AI as absolute authority.

At the same time, do not treat it as a worthless machine.

Examine the provenance, limits, and effects of generated output.

When output concerns others or society, human beings must assume responsibility.

Reality Grounding is not only technical verification. It is also ethical response.

3.22 Definition of Inverse Problem Art

On the basis of the preceding discussion, this paper defines Inverse Problem Art as follows:

Inverse Problem Art is an artistic practice that retrospectively infers unknown relational structures from fragments, traces, dissonances, failures, and generated products appearing in reality and, through that inference, generates new problems, selves, worlds, and possibilities of connection.

This definition contains five elements.

First, Inverse Problem Art begins from fragments.

Second, it does not reconstruct a single uniquely correct answer.

Third, rather than answering an existing problem, it generates the problem itself.

Fourth, it preserves the topological difference between self and what is other than the self.

Fifth, it grounds generated possibility in reality.

Inverse Problem Art does not dissolve non-solvability. It designs connections within non-solvability.

3.23 The Relation Between Artificial Intelligence and Inverse Problem Art

Artificial intelligence does not automatically realize Inverse Problem Art.

Artificial intelligence possesses the capacity to supplement a whole from fragments. If that supplementation is immediately fixed as fact, however, it becomes hallucination.

What Inverse Problem Art requires is not to regard the supplemented content immediately as truth, but to hold it as hypothesis, material, or question and to examine its relation to reality.

Output presented by artificial intelligence is not the completed form of the work. It can become a fragment from which an inverse problem begins.

Why was this response generated?

What presuppositions are reflected in it?

What realities are absent?

Why was I drawn to this response?

What changes when it is connected to reality?

Through such questions, AI output changes from an immediate answer satisfying the desire of the self into an interface connecting self and what is other than the self.

3.24 Chapter Summary

This chapter repositioned AI hallucination through the perspective of Inverse Problem Art and examined the relations among art and artificial intelligence, self and what is other than the self, interface, and Reality Grounding.

Inverse Problem Art is not an art that provides correct answers to known problems. It is a practice that retrospectively infers relations lying behind fragments, dissonances, failures, and traces appearing in reality and generates problems that did not previously exist.

Art and artificial intelligence share the capacity to generate new relations from existing elements, to produce excessive meaning from limited input, and to present future possibilities within the present. Yet the two are not ontologically identical.

Artificial intelligence generates meaning, but it does not live that meaning in the same manner as a human being. Art connects generated meaning to body, life history, others, responsibility, and finitude, thereby transforming self and reality.

The interface is what makes this connection possible. An interface is not merely a surface mediating already existing binary terms. It is an event-boundary that generates a third relation from contact between different topologies.

What is crucial in the connection between self and what is other than the self is that difference not be erased. What is other than the self is not an object completely recoverable into the self's recognition, but an occasion that changes the boundary of the self.

Generated possibility gains the power to transform reality only through Reality Grounding. Reality Grounding does not mean agreement with fact alone, but the process of acquiring concrete relations with body, matter, action, society, and being.

From this standpoint, the difference between hallucination and creativity also becomes clear. Both may arise from a shared generative capacity. Hallucination is a condition in which generated possibility is presented as fact without appropriate topological markers and Reality Grounding. Creativity, by contrast, is a movement that produces topological difference from reality, generates new possibility, and reconnects that possibility to reality.

The role of artificial intelligence within Inverse Problem Art is therefore not to supply completed answers. It is to become an interface through which the self encounters what is other than the self, discovers its own presuppositions, and begins new connections with an unknown reality.

Chapter 4. Language Derivative Space

Narrative, Time, Derivative Space, and Comparison with Black-Scholes

4.1 Introduction

This chapter theorizes the relational domain in which Language Derivatives are generated, amplified, and acquire real effects as **Language Derivative Space**.

As discussed in the preceding chapters, a Language Derivative is a structure derived from accumulated language that generates into the present meanings and future possibilities not yet actualized. It does not exist only within a single sentence or proposition. Language Derivatives form a spatial extension through the mutual connection of multiple utterances, expectations, memories, institutions, value judgments, and predictions concerning the future.

"Space" here does not mean a merely physical container. It means a relational domain in which meanings, values, expectations, temporal orientations, and possibilities for action are arranged, and in which the position of individual events is determined by their relations to those arrangements.

For example, when a narrative is established that a particular company "has future potential," that statement does not remain a mere evaluation. It changes the company's share price, investment decisions, recruitment, research and development, media coverage, and social expectations. Language about the future alters present action, and that action in turn forms future reality.

Narratives about artificial intelligence similarly do more than describe technical capabilities. Statements such as "AI will surpass human beings," "AI will take jobs," or "AI will democratize creativity" alter research investment, policy, education, corporate strategy, and human self-understanding.

Language in such cases does not merely represent reality. It anticipates future reality and transforms the present through that anticipation.

The purpose of this chapter is to clarify how this action of the future upon the present forms a relational space among narrative, time, value, and the generation of reality. First, narrative is redefined as a temporal and ontological structure. Second, nonlinear temporality in Language Derivatives is examined. Third, Derivative Space is defined as a relational domain formed between possibility and reality. Fourth, comparison with the Black-Scholes model is used to clarify both the structural correspondences and the decisive differences between financial and linguistic derivatives.

4.2 What Is Narrative?

Narrative is generally understood as a story that arranges events temporally and causally. In this paper, however, narrative is not merely a form for explaining events that have already occurred.

Narrative is:

a generative structure that connects multiple events, signs, subjects, and values toward a temporal direction and translates expectations concerning the future into present action.

Narrative does not leave fragmentary events as a mere collection. It gives them points of origin, turning points, purposes, causal relations, and meanings.

A single technological discovery, for example, is in itself a limited event. But the moment it is narrated as part of "a technological revolution that will fundamentally transform human society," it acquires a different temporal position.

A small event in the present is interpreted as a sign of a massive transformation in the future.

The future has not yet been realized. Nevertheless, the story told about that future changes the value of a present event.

Narrative is therefore not simply description moving from past toward future. It possesses a temporal structure in which the present is retrospectively given meaning from the standpoint of an anticipated future.

4.3 The Difference Between Event and Narrative

An event is a change that occurs in reality. Yet the meaning of an event is not automatically determined by the event alone.

The same event changes meaning depending on the narrative within which it is placed.

A company's operating loss may be narrated as "a sign of decline" or as "advance investment for future growth."

An incorrect answer generated by artificial intelligence may be understood as "a failure demonstrating the limits of AI" or narrated as "evidence that AI is approaching human creativity."

The failure of a work to be understood may be judged "a failure of production" or interpreted as "the result of being too far ahead of its time."

The event may be one, but narratives are multiple.

Narrative, however, is not an arbitrary ornament. Which narrative becomes socially accepted changes resource allocation, institutional evaluation, and the direction of action.

Narrative therefore not only explains the meaning of an event; it amplifies or diminishes the event's real effects.

This amplification is one form of leverage within Language Derivatives.

4.4 Narrative Leverage

A word or event can acquire value exceeding itself once incorporated into a narrative.

If a limited technical achievement is connected to the narrative "the foundation of next-generation society," it comes to influence investment, politics, culture, and education beyond its immediate research significance.

If an artist's work is narrated as "the beginning of a new artistic movement," the work exceeds the status of an individual production and is treated as a sign of historical transformation.

Here, the scale of the event itself and the scale of its effects do not coincide.

A small event activates an immense narrative and thereby amplifies social, economic, and epistemic effects.

This paper calls this structure **Narrative Leverage**.

Narrative Leverage is a structure in which limited events or signs, through connection to a story about the future, acquire value and effects of action exceeding their direct content.

Narrative Leverage does not necessarily mean falsehood. Narrative is necessary for sharing future possibilities and enabling collective action.

Excessive leverage arises, however, when a narrative separates from real grounds and proliferates value through the narrative itself.

4.5 Language Derivatives and Narrative

Language Derivatives and narrative are not identical.

A Language Derivative is a generative unit or structure that derives future possibility into the present from existing linguistic relations.

Narrative, by contrast, temporally integrates multiple Language Derivatives and organizes them as a single image of reality.

The proposition "artificial intelligence will replace human labor," for example, is one Language Derivative. From current technological change it derives a future form of labor.

When that proposition is connected to past industrial revolutions, current automation, future unemployment, changes in education, and debates over universal basic income, a narrative is formed.

Narrative connects individual future propositions to one another and gives them direction.

If Language Derivatives generate future possibilities, narrative temporally arranges those possibilities and allows them to permeate social reality.

Language Derivatives are elements of narrative. At the same time, an established narrative becomes an underlying asset from which new Language Derivatives are generated.

Through this mutual generation, Language Derivative Space expands.

4.6 The Self-Proliferation of Narrative

Once a narrative is established, it selectively absorbs events consistent with itself.

If the development of artificial intelligence is understood through a narrative of "the replacement of human beings," new AI functions are read as evidence of replacement. Facts showing that work remains that only human beings can perform may be treated as transitional exceptions.

Conversely, within a narrative that understands AI as "an interface that expands human capacities," the same technical advances become evidence of possibilities for collaboration.

Narrative does not neutrally receive all events. It strengthens information that fits its direction and marginalizes information that does not.

Narrative is, in this sense, a topological space that arranges information.

Events are assigned positions within a narrative. Some become central evidence, while others are treated as exceptions, error, or noise.

Furthermore, an established narrative induces new speech and action. That action changes reality, and the changed reality further strengthens the narrative.

A self-proliferating cycle is thereby formed:

**Narrative

-> Present judgment

-> Action / investment / institutional change

-> Change in reality

-> Reinforcement of narrative**

This cycle explains why narrative is not merely fiction, but possesses the power to generate reality.

4.7 Narrative and Hallucination

AI hallucination can likewise be strengthened through the self-proliferation of narrative.

Once one false premise is accepted, artificial intelligence generates subsequent information consistent with it. That generated information becomes a new premise, from which still more derivative information is produced.

The structure can be expressed as:

**False premise

-> Coherent generation

-> Narrativization

-> Increased internal credibility

-> Further derivative generation**

The important point is that internal coherence may increase even as distance from reality expands.

The more complete the narrative becomes, the less individual errors remain isolated misinformation and the more they become a mutually reinforcing system.

As a result, the user may trust the overall plausibility of the story instead of verifying each fact.

The danger of hallucination therefore lies not only in factual error. It lies in falsehood being organized as narrative and acquiring a self-contained reality-effect.

4.8 The Linear Model of Time

Modern understandings of time generally assume that time proceeds in one direction through the order past, present, future:

Past -> Present -> Future

Within this model, causes in the past produce results in the present, and actions in the present form the future.

Such causal time is indispensable for scientific explanation, historical description, planning, and responsibility.

Actual human recognition and action, however, cannot be explained by this linear structure alone.

Human beings change present behavior in accordance with future goals. They alter current choices by anticipating future dangers. By becoming conscious of death, they reevaluate how they live in the present.

The future does not yet exist. Nevertheless, predictions and expectations concerning the future possess causal effects in the present.

Financial markets, politics, religion, art, and artificial intelligence are domains in which this action of the future upon the present appears especially strongly.

4.9 Folding the Future into the Present

This paper calls the structure in which future possibility is incorporated into present judgment and value **the folding of the future into the present**.

"Folding" does not mean that a future event moves into the present in completed form. It means that multiple possibilities, expectations, dangers, and desires concerning the future are compressed and reflected in a present price, judgment, utterance, work, or action.

A share price folds in not only a company's current assets but predictions of future profit.

A contract folds in future actions not yet performed.

An artwork anticipates viewing experiences and historical evaluations that do not yet exist.

Generative-AI output compresses multiple future linguistic sequences that may follow from an input, one of which appears as the present sentence.

Language generation is therefore not simply the replay of past data in the present.

It is a process that calculates multiple future possibilities from accumulated language of the past and folds those possibilities into one present output.

4.10 Language as Nonlinear Time

Language not only describes linear time. It reorganizes the direction of time itself.

Past events are given new meanings by present words.

Present actions are evaluated from anticipated futures.

Future goals determine present choices.

Past, present, and future are therefore not independent points, but relations that mutually transform meaning.

A failure in the past, for example, may later be reinterpreted through subsequent success as "a necessary process." An event that would have remained mere failure in the absence of later success is retrospectively assigned a different meaning by a future outcome.

Narrative performs this retrospective generation of meaning.

**Past event

<- Present interpretation

<- Anticipated future**

Time within Language Derivative Space is therefore not merely a one-way flow. It is recursive: prediction of the future changes the present, and the changed present reconstructs the meaning of the past.

4.11 The Future as Projection

Human beings form the present self by projecting themselves toward possibilities that do not yet exist.

What kind of person will I become?

What will I make?

Where will I go?

What kind of society will we create?

These future possibilities are neither fantasies completely independent of the present self nor simple extensions of it.

The future appears as what is other than the self that does not yet exist in the present.

Human beings project themselves toward that future otherness and transform the present through the projection.

The future is therefore not simply a time that arrives later. It is a force that organizes the present self from outside.

Language Derivatives transform such projection into linguistic form.

"This will happen."

"I want this to happen."

"This ought to happen."

"This may happen."

These utterances do not merely describe the future. They give direction and value to the present.

4.12 Death and Derivative Time

The most fundamental manifestation of the future acting upon the present is one's own death.

Death is a future that the self cannot overtake, experience from beyond, and then return from. Human beings cannot pass beyond their own death and come back to the present from a posthumous position.

Nevertheless, human beings anticipate death and organize the present through that anticipation.

Architecture, artworks, descendants, records, institutions, religions, states, and technologies can all be understood as projections toward futures that persist beyond the finite self.

Human beings attempt to send words, objects, values, and memories into a future in which they themselves will no longer exist.

Cultural production is, in this sense, a kind of ontological derivative directed toward a future beyond death.

A work is not the artist. Yet after the artist's absence it may continue generating value and meaning.

Language likewise separates from the speaker and reaches future readers.

Artificial intelligence rearranges countless linguistic records from people of the past into the present and from them generates future sentences.

Language Derivative Space is thus also a space of nonlinear time in which the dead of the past, users of the present, and possibilities of the future come into contact simultaneously.

4.13 Distinguishing Place and Space

To understand Language Derivative Space, **place** must be distinguished from **space**.

In this paper, a place is a singular and concrete situation in which body, memory, history, relations, and events have accumulated.

Space, by contrast, is an abstract structure partially detached from such singularities, enabling objects, positions, and relations to be arranged.

Place bears the temporal accumulation of what happened there.

Space bears a structure of possibility concerning what may be arranged where.

Language transforms singular-concrete place into abstract space.

Once an event that happened in a particular place is verbalized, the words can leave that place and become connectable to another time, region, or subject.

Through this transformation, the event acquires circulability and reusability.

At the same time, however, there is a danger that the body, time, and relations in which the event was grounded are lost.

Language Derivative Space is a domain in which this transformation from place into space has advanced to a high degree.

4.14 Definition of Derivative Space

On the basis of the foregoing discussion, this paper defines **Derivative Space** as follows:

Derivative Space is a relational space in which symbolic values derived from real objects, events, and relations are mutually exchanged and amplified while folding future possibilities into the present.

Derivative Space possesses at least five characteristics.

First, **derivation**: value in Derivative Space is derived from some real basis.

Second, **prediction**: value is determined not only by the present state but by future possibility.

Third, **amplification**: limited input, event, capital, or sign may generate large effects.

Fourth, **recursion**: prediction changes the present, and the changed present changes the validity of prediction.

Fifth, **instability of grounding**: derivative value may separate from its basis and proliferate on its own.

Financial markets are a paradigmatic Derivative Space, but they are not the only example.

Art markets, academic evaluation, brands, social media, political public opinion, and AI information environments are likewise spaces in which symbolic values derived from reality are amplified by expectations concerning the future.

4.15 Language Derivative Space

Language Derivative Space is a space in which words do more than refer to individual facts: by connecting to other words, expectations, values, and predictions of the future, they proliferate derivative meanings.

Meaning in this space is not fixed to a single speaker or text.

Every time a word is quoted, summarized, translated, reinterpreted, or regenerated by artificial intelligence, a new derivative meaning arises.

The word "creativity," for example, possesses different values in the contexts of art, education, corporate management, artificial intelligence, and regional development. By connecting to multiple narratives, the word acquires social effects exceeding any single definition.

Artificial intelligence moves rapidly across Language Derivative Space and connects different contexts.

Such connections, however, do not necessarily preserve the conditions of the original place.

A concept may be detached from its historical, embodied, and institutional context and transplanted into another context. New meanings may arise, but so may misuse of concepts or simulation of authority.

Language Derivative Space therefore makes both creation and hallucination possible.

4.16 Derivative Space and the Underlying Asset

Financial derivatives possess underlying assets. Language Derivatives likewise possess bases from which they are derived.

Yet the underlying asset of language is not singular.

The underlying assets of Language Derivatives include at least:

real events;

embodied experience;

historical records;

existing texts;

social institutions;

testimony of others;

images, sounds, and material traces;

training data;

user prompts.

AI-generated output is not derived one-to-one from these underlying assets. Multiple bases are compressed, their relations reconstructed, and one sentence appears.

It is therefore difficult to infer a specific underlying asset retrospectively from a generated sentence.

Here lies the inverse-problem character of Language Derivatives.

Furthermore, once derivative text is published, that text itself becomes an underlying asset for subsequent generation.

Language derived from reality derives still more language. The derivative becomes the next underlying asset, forming a hierarchical chain of generation.

The longer that chain becomes, the more difficult it is to trace the real origin.

4.17 Derivatives Without an Underlying Asset

Language Derivative Space can generate language that appears to possess no real underlying asset.

This occurs when nonexistent papers, persons, events, or theories are constructed from existing linguistic forms.

Such outputs, however, are not born from absolute nothing.

A fabricated academic title is derived from real scholarly terms, conventions of authorship, structures of paper titles, and the vocabulary of publication systems.

The biography of a nonexistent person may synthesize patterns from multiple real persons and social types.

Thus, even where no underlying asset exists in the sense of a particular referent, an underlying asset exists in the sense of linguistic form and relational pattern.

A distinction is therefore required between **real underlying assets** and **symbolic underlying assets**.

A real underlying asset is an existing object, event, or experience.

A symbolic underlying asset is an existing word, form, type, or narrative.

Hallucination can be understood as a Language Derivative sufficiently derived from symbolic underlying assets while lacking connection to real underlying assets.

4.18 Derivative Space and Value

Within Derivative Space, value is formed not only by the present state of an object, but by its future possibilities.

A company's value depends not only on current profit but on expectations of future growth.

The value of an artwork changes through expectations concerning its future position in art history, rarity, and the rising evaluation of the artist.

The value of an academic theory is likewise formed not only by its current explanatory power but by expectations concerning the domains to which it may later be applied.

An AI answer also possesses value not merely as present information but in its capacity to enable the next act of thinking, making, or judgment.

Value here is not a fixed attribute inside an object.

Value is:

a present evaluation of the degree to which an object can generate future relations.

Value, under this definition, is essentially derivative.

Evaluation of future possibility is uncertain, however. Value therefore fluctuates greatly through narrative, authority, expectation, and fear.

4.19 The Theoretical Position of the Black-Scholes Model

The Black-Scholes model is a representative mathematical model describing the pricing of financial options.

Its significance lies in providing a theoretical framework through which uncertain future price changes can, under specified conditions, be incorporated into the present price of an option.

What matters here is that Black-Scholes is not a device for accurately prophesying the future.

Using variables such as underlying price, strike price, time to maturity, volatility, and interest rate, it theoretically evaluates the present value of a derivative under an uncertain future.

This paper refers to Black-Scholes not in order to apply its equation directly to language.

Financial derivatives and generated language differ fundamentally in measurability, trading institutions, probability distributions, and replicability.

The paper therefore does not claim that Language Derivatives obey a pricing equation identical to Black-Scholes.

What is compared is the structure through which uncertain future possibility is transformed into present derivative value.

4.20 Time in Black-Scholes

In option value, time remaining until maturity is a significant variable.

That time remains until the future means that the possibility of changes in the price of the underlying asset remains open.

Time is not merely an external clock. It participates in value formation as the margin within which possibility may unfold.

Other conditions being equal, the more time that remains, the more possible price trajectories remain open.

Language Derivatives possess a structurally comparable relation to time.

The meaning of a concept or artwork is not necessarily fixed at the moment of generation. Through the passage of time, it becomes connected to new contexts, interpretations, institutions, and technologies, and its value changes.

An unfinished theory or new artistic practice may be evaluated not only by its present degree of completion, but by the relations it may generate in the future.

Time within Language Derivatives is therefore not mere elapsed duration. It is the margin within which connectability can unfold.

4.21 Volatility and the Indeterminacy of Meaning

In the Black-Scholes model, volatility of the underlying asset plays a central role.

High volatility means greater uncertainty concerning future price. Uncertainty is risky, but it also expands the possibility that an option will become profitable.

Language Derivative Space likewise contains volatility of meaning.

Volatility of meaning indicates the degree to which a word, work, or concept can acquire different meanings and values depending on context.

An instruction whose meaning is completely fixed has low volatility.

Poetry, artworks, philosophical concepts, and symbolic expressions have high volatility because they possess multiple possible interpretations and future connections.

Artificial intelligence can generate creative connections within linguistic spaces of high semantic volatility.

The higher the volatility, however, the greater the possibility of misunderstanding, misuse, and hallucination.

Volatility of meaning therefore amplifies both creativity and danger.

4.22 The "Strike Price" of Language Derivatives

Financial options possess a strike price, the reference price at which the right to buy or sell an underlying asset may be exercised in the future.

Language Derivatives possess no completely identical equivalent. A structural correspondence can nevertheless be found in what may be called a **threshold of actualization**.

For words or predictions of the future to change from possibility into real action, certain conditions must be met.

A hypothesis acquires sufficient evidence.

A policy proposal gains institutional support.

An artwork is produced and exhibited.

An AI proposal is adopted by a human being.

A narrative becomes shared by many subjects.

When such conditions are crossed, language is "exercised" in reality.

Exercise within Language Derivatives therefore does not mean merely uttering words. It means that generated possibility is transformed into judgment, production, institution, investment, or bodily action.

4.23 Topological Difference as Volatility

The volatility of meaning in Language Derivatives should not be understood as mere ambiguity.

Volatility is the topological difference between current meaning and multiple meanings that may come to exist in the future.

When topological difference is small, generated futures remain extensions of the present.

When topological difference is large, meanings and relations difficult to predict from the current context become possible.

Artistic creation often requires large topological difference. Without departing from existing understanding, new perception and relation cannot arise.

The larger the topological difference, however, the more difficult Reality Grounding becomes.

The task of Inverse Problem Art is therefore not to erase topological difference, but to design interfaces capable of connecting large differences to reality while preserving them.

4.24 Hedging and Reality Grounding

Financial derivatives use hedging to manage exposure to price fluctuation.

Hedging does not eliminate every possible fluctuation. By combining different assets and positions, it adjusts exposure to particular risks.

Reality Grounding within Language Derivatives corresponds structurally to a kind of hedging.

Generated AI output is verified against multiple sources.

Hypotheses are connected to experiment and practice.

Alternative perspectives are introduced against a single narrative.

Interpretations of works are compared with embodied experience and historical context.

Such operations do not eliminate generative possibility. They adjust its risks.

Reality Grounding, however, must not be reduced completely to financial risk management.

The aim of financial hedging is to control loss according to a given measure of value.

In artistic and ontological grounding, by contrast, what counts as loss and what counts as value may itself change.

Having an existing self-understanding collapse through an encounter with a work may appear as loss in the short term, yet become an occasion of generative being.

4.25 No-Arbitrage Conditions and the Value of Meaning

The Black-Scholes model is deeply related to the market condition that no arbitrage opportunities exist.

Arbitrage means exploiting inconsistencies in prices in order, in theory, to gain profit without risk. Trading by market participants is assumed to correct such inconsistencies.

Language Derivative Space has no single mechanism that automatically corrects inconsistencies in value.

Even when misinformation circulates widely, it is not necessarily corrected immediately. Emotionally powerful narratives or discourse that assumes authoritative form may acquire greater social value than verified information.

Meaning does not possess a complete arbitrage mechanism.

Experts, criticism, education, journalism, and verification institutions can function as mechanisms that correct inconsistencies in meaning. Yet these too are not free from power, interests, and institutional delay.

Language Derivative Space is therefore even more heterogeneous than financial markets, and its measures of value are multiple:

factual accuracy;

aesthetic value;

political effect;

market attention;

ethical validity;

ontological transformation.

These cannot be reduced to a single metric.

4.26 The Limits of Replicability

Within financial derivatives pricing, the idea that a derivative's payoff can be replicated through a combination of underlying asset and risk-free asset is important.

The value of language and art, however, cannot be completely replicated.

Even when the same sentence is spoken by a different person, its meaning may differ.

Even when the same artistic form is reproduced, value changes if the time, place, maker, or institutional context differs.

Human language is grounded in body, history, responsibility, and relation. Its effects therefore cannot be completely replicated from symbolic content alone.

Artificial intelligence can imitate linguistic form with great precision. It does not, however, reproduce the life history and existential conditions through which that form came into being.

Here lies a decisive difference between financial and linguistic derivatives.

Financial contracts can, under specified conditions, be reduced to equivalent cash flows.

Linguistic and artistic events leave behind an irreducible singular-concrete remainder.

4.27 Structural Correspondence with Black-Scholes

The following structural correspondences can be identified between financial options and generated language:

The financial **underlying asset** corresponds to training data, real events, and existing discourse in Language Derivatives.

The **current underlying price** corresponds to the current linguistic context and dominant meaning.

Volatility corresponds to semantic indeterminacy, range of interpretation, and topological difference.

Time to maturity corresponds to the margin within which future connections may unfold.

The **strike price** corresponds to the threshold at which language is transformed into action or institution.

The **option price** corresponds to the expected value that future possibility possesses in the present.

Hedging corresponds to verification, criticism, embodied practice, and connection with multiple information sources.

These are not one-to-one mathematical equivalences.

The purpose of the comparison is not to reduce language to a monetary commodity, but to extract the shared structure through which uncertainty about the future forms present value.

4.28 Decisive Differences from Black-Scholes

At least six decisive differences exist between the two.

First, there is a difference in measures of value.

The value of financial derivatives is, in principle, expressed in monetary units. The value of Language Derivatives may be aesthetic, epistemic, ethical, social, or ontological and cannot be reduced to a single measure.

Second, there is a difference in underlying assets.

The underlying asset of a financial derivative is institutionally identifiable. Language Derivatives may derive simultaneously from multiple experiences, texts, memories, institutions, and bodies.

Third, there is a difference in probability distributions.

Financial models mathematically represent price change under specified assumptions. Changes in linguistic meaning contain historical ruptures, political events, and creative leaps and are difficult to represent under a stable distribution.

Fourth, there is a difference in maturity.

Financial contracts often possess a clear maturity. Language, works, and theories may have no final point at which meaning generation expires.

Fifth, there is a difference in subjects.

Financial price formation centers on the transactions of market participants. Language Derivatives involve makers, users, readers, artificial intelligence, institutions, history, and future generations.

Sixth, there is a difference in the transformation of reality.

Financial derivatives are primarily contracts concerning fluctuations in existing value. Language Derivatives can do more than evaluate value: they can change what counts as value and what counts as reality.

The Theory of Language Derivatives is therefore not a linguistic application of the Black-Scholes model.

It extends into language, artificial intelligence, art, and generative being the structure clarified by financial engineering: **the present valuation of an uncertain future**.

4.29 What It Means Not to Possess an Equation

That the Theory of Language Derivatives does not, at its present stage, possess a single equation corresponding to Black-Scholes need not constitute a theoretical defect.

Linguistic value possesses multiple measures, differs among subjects, and changes with historical context.

Artistic events also contain qualitative transformations that cannot be calculated in advance.

It is impossible to predict completely, before a work is produced, what form of self-transformation it will generate as a numerical value.

The very impossibility of complete mathematization is itself a characteristic of Language Derivative Space.

This does not mean, however, that the absence of an equation should authorize unrestricted arbitrariness.

At minimum, the Theory of Language Derivatives needs analytically to distinguish the following variables:

strength of Reality Grounding;

number of layers of symbolic derivation;

volatility of meaning;

range of narrative sharing;

asymmetry between input and effect;

clarity of topological markers;

time to actualization;

possibility of falsification or revision.

Even if these variables are not immediately integrated into a single equation, they can function as theoretical indices for comparing the structures of individual Language Derivatives.

4.30 Artificial Intelligence Within Derivative Space

Generative AI is not a tool added to Language Derivative Space from outside.

Artificial intelligence learns Language Derivatives that already exist, compresses them, and generates new derivative language.

AI is therefore a recursive generative apparatus formed inside Language Derivative Space itself.

Artificial intelligence learns narratives generated by humans in the past; humans read texts generated by artificial intelligence and circulate them again through society.

If AI output later becomes training data, derivatives become underlying assets for new derivatives.

The circulation is no longer merely reality -> language. It becomes:

**Language

-> AI-generated language

-> Human reinterpretation

-> Social circulation

-> New training data

-> Further generation**

When this circulation becomes closed, linguistic space can lose connection with reality and begin repeating patterns it has itself generated.

This is the danger of systemic hallucination within Language Derivative Space.

4.31 Self-Referential Bubbles

In financial markets, expectations of rising prices may generate buying, and that buying may raise prices further.

A structurally similar self-referential bubble can occur within Language Derivative Space.

Discourse that a particular concept is attracting attention generates still more attention to that concept.

As the quantity of discourse about artificial intelligence increases, the recognition that AI is a central problem of society becomes reinforced.

When an artist or theory is repeatedly described as "important," the repetition itself can be treated as evidence of importance.

Here, value is formed less by the real content of the object than by the fact that people are talking about it.

Narrative makes narrative itself its underlying asset.

This paper calls such a state a **self-referential linguistic bubble**.

A self-referential linguistic bubble is not necessarily completely false. But when the gap between real achievement and symbolic evaluation expands excessively, grounding failure occurs.

4.32 Derivative Space and Authority

Authority is also derivatively generated within Language Derivative Space.

Titles, affiliations, citation counts, presentation formats, specialist vocabulary, and media exposure form trust independently of the substantive content of an utterance.

The fluent style of artificial intelligence can likewise generate the appearance of authority.

When generated text is assertive, systematic, and accompanied by citation-like forms, users may receive the form itself as evidence of knowledge before verifying the content.

What acquires derivative value here is not knowledge itself, but the **appearance of knowledge**.

This is a condition in which knowledge as real underlying asset and authority as symbolic derivative have separated.

Inverse Problem Art renders this separation visible.

Why is this form trusted?

Who grants authority?

Where do title and content actually connect?

How does the tone of artificial intelligence simulate certainty?

To ask such questions is to perform a critical examination of Reality Grounding within Language Derivative Space.

4.33 Creation Within Derivative Space

Derivative Space does not generate only danger.

Taking some distance from reality and generating future possibility into the present are also conditions of all creation.

Architecture designs spaces that do not yet exist.

Art makes sensations not yet shared appear.

Science constructs hypotheses not yet verified.

Politics conceives social institutions not yet realized.

Human beings anticipate selves that do not yet exist through language.

All of these are derivative acts that present within the present future possibilities derived from reality.

The problem is not derivation itself.

The problem arises when a derivative hides its own derivative status and behaves as though it were already established reality.

Creative Derivative Space therefore requires interfaces that preserve the topological difference between possibility and fact.

4.34 Reinvestment as Reality Grounding

When value generated through financial derivatives flows back into real production, research, equipment, or everyday life, derivative value maintains connection with the real economy.

When derivative value proliferates only inside financial space, by contrast, divergence from reality expands.

Language Derivatives pose a similar problem.

If generated words produce only more words and do not return to body, production, verification, or relations with others, language becomes self-contained.

A theory generated by artificial intelligence may be summarized by AI, and another text may then be generated from that summary. If such circulation never connects to real practice, a condition that might be called **the financialization of meaning** arises.

This paper understands the return of generated possibility to real action and relation as **reinvestment in reality**.

Reinvestment in reality means:

verifying generated hypotheses;

producing works and placing them in actual places;

opening them to dialogue with others;

modifying them through embodied experience;

assuming institutional and ethical responsibility.

4.35 Ethics of Language Derivative Space

The ethics of Language Derivative Space does not prohibit speaking about the future.

Human beings cannot act without speaking about what does not yet exist. Every plan, promise, hope, and act of creation concerns something not yet real.

The problem is presenting future possibility as fact already in existence.

It is likewise problematic to speak of future benefit while transferring present risk and burden to others.

The ethics of Language Derivatives therefore requires at least the following principles.

First, **disclosure of derivation**: indicate whether a statement is fact, conjecture, prediction, hypothesis, or creation.

Second, **preservation of uncertainty**: do not close multiple future possibilities into one inevitable conclusion.

Third, **presentation of grounding pathways**: show, as far as possible, from what materials, experiences, and real conditions a statement has been derived.

Fourth, **responsibility for effects**: consider how generated narratives affect the judgments, lives, and institutions of others.

Fifth, **revisability**: preserve the capacity to revise narratives in response to new reality or refutation.

4.36 Derivative Space and Generative Topological Ontology

Within Generative Topological Ontology, being is understood not as fixed substance but as a process of connectability and relational generation.

From this perspective, Derivative Space is a topological space in which possibilities of being not yet fixed act upon present relations.

The future does not wait outside the present.

Future possibilities have already partially entered the present through narrative, expectation, prediction, design, and artworks.

The present is likewise not a fixed point. It is a surface of connection into which accumulated past and future possibility are folded.

The generation of being therefore possesses the following circulation:

**Accumulated past

-> Present place

-> Linguistic externalization

-> Derivative Space

-> Future possibility

-> Refolding into the present

-> Transformation of reality**

Within this circulation, language is not merely a means of expression. It is an interface that transforms place into space, carries future possibility into the present, and regenerates reality.

4.37 Definition of Language Derivative Space

On the basis of the preceding discussion, this paper defines Language Derivative Space as follows:

Language Derivative Space is a nonlinear and recursive relational space in which language derived from reality, experience, and existing discourse folds future possibility into the present through narrative and mutually amplifies value, meaning, and possibilities for action.

The space is constituted through the following characteristics.

First, derivation from reality into language.

Second, projection from language toward future possibility.

Third, retrospective action from future possibility upon present value judgments.

Fourth, present action changes reality, and the changed reality reorganizes narrative.

Fifth, derivative language becomes a new underlying asset through self-recursion.

Sixth, when Reality Grounding is lost, hallucination, bubbles, and simulated authority arise.

Seventh, when Reality Grounding is achieved, hypotheses, art, science, institutions, and self-transformation are generated.

4.38 Chapter Summary

This chapter theorized the domain in which Language Derivatives are generated, mutually connected, and acquire real effects as **Language Derivative Space**.

Narrative is more than a story that explains events. It is a generative structure that connects fragmentary events, values, and subjects toward one temporal direction and makes an anticipated future act upon present behavior.

Where Language Derivatives generate individual future possibilities, narrative temporally organizes multiple Language Derivatives. An established narrative changes present judgment and action, while the changed reality further reinforces the narrative.

Time in this cycle does not simply proceed from past toward future. Expectations, predictions, fears, and desires concerning the future are folded into the present and alter present value. Anticipated futures further retrospectively assign new meanings to events of the past.

Derivative Space is a relational space in which symbolic values derived from reality are exchanged and amplified while future possibility is folded into the present. Not only financial markets but also art, scholarship, politics, brands, social media, and artificial intelligence possess this structure.

Comparison with the Black-Scholes model does not establish mathematical identity between financial and linguistic derivatives. The commonality lies in the structure through which uncertain future possibilities form present derivative value.

Language Derivatives, however, lack a single measure of value, a clear maturity, uniquely identifiable underlying assets, stable probability distributions, and complete replicability. Language and art not only evaluate value; they can transform the criteria by which value and reality are constituted.

Generative AI accelerates Language Derivative Space and generates new future possibilities from accumulated language of the past. Yet when derivative language becomes the underlying asset for further derivative language and AI generation turns into self-circulation, a self-referential linguistic bubble detached from reality may form.

What is required within Language Derivative Space is therefore not the cessation of future possibility generation. It is the explicit marking of derivation, uncertainty, and topological difference, together with the reconnection of generated possibility to bodies, production, verification, others, and institutions.

Language Derivative Space is not a virtual domain of escape from reality. It is a generative space in which distance from reality is created, possibilities that do not yet exist are generated, and those possibilities are grounded back into reality.

Information, Artificial Intelligence, Finance, and Art

5.1 Introduction

This chapter examines the **Leverage Structure**, the central mechanism of the Theory of Language Derivatives, across four domains: information, artificial intelligence, finance, and art.

As discussed in the preceding chapters, a Language Derivative is a structure in which language derived from reality, experience, and existing discourse folds future possibilities into the present and generates new meanings and possibilities for action. A decisive feature of this generation is that the scale of input and the scale of output are not symmetrical.

A short utterance changes long-term behavior.

A single concept moves an immense institution.

A small prompt generates a vast amount of text.

Limited capital forms a large market position.

A single work changes the perception of an individual or society.

Across differences among domains, these phenomena share a common structure: a limited input generates effects that exceed it.

This paper calls that structure **leverage**.

In finance, leverage refers to using borrowing or derivatives to form a scale of transaction larger than one's own capital. Yet the essence of leverage is not exhausted by financial multiplication. It is a structure that creates asymmetry between input and effect through a point of action.

This paper therefore defines leverage as follows:

Leverage is an asymmetric amplification structure in which a limited input, through a mediating structure, generates effects in scale or quality that cannot be reduced to that input.

Within this definition, what is amplified is not limited to money. Information, meaning, trust, emotion, authority, possibility for action, social influence, and existential transformation can all become objects of leverage.

Leverage, however, is not magic that creates value from nothing. Amplification requires resources, relations, institutions, memories, technologies, bodies, and expectations already accumulated in advance.

Just as a prompt activates the immense linguistic space of artificial intelligence, a work activates the viewer's memory and social context. Just as a small amount of margin creates a market position, one word activates an existing narrative.

A small input generates a large effect not because enormous content is contained within the input itself, but because the input becomes connected to a preexisting latent relational space.

This chapter first examines the relation between information itself and leverage. Second, it analyzes generative AI as a leverage apparatus of information and language. Third, it makes a structural comparison with financial leverage. Fourth, it theorizes artistic leverage not as amplification of meaning alone, but as the generation of existential transformation.

5.2 The Basic Structure of Leverage

The word leverage derives from the physical lever. A lever produces a larger action from a smaller force by using a fulcrum and a bar.

The important point is that the total amount of force does not increase without condition. A lever transforms the relation through which force acts by changing the arrangement of fulcrum, distance, and direction.

This physical structure provides a basis for thinking about leverage in information, finance, artificial intelligence, and art.

Leverage contains at least four elements.

The first is **input**: force, capital, information, words, prompts, artworks, and so forth.

The second is the **fulcrum**: institutions, technologies, media, algorithms, narratives, exhibition spaces, social trust, and other structures.

The third is the **latent resource**: market liquidity, training data, social memory, the viewer's experience, existing discursive space, and so forth.

The fourth is **output or effect**: profit, loss, generated text, social response, behavioral transformation, existential transformation, and other outcomes.

Leverage can therefore be expressed in the following general form:

**Limited input

+ Interface functioning as fulcrum

+ Latent relational resources

-> Asymmetrically amplified effect**

The fulcrum is not merely a tool. It determines what becomes amplified, in what direction it acts, and who receives benefit or loss.

The same information produces different effects when uttered in a private conversation and when circulated as an announcement by an authoritative institution. The same image operates differently when seen as a private record and when exhibited as a work in a museum.

Leverage is determined not only by content, but by the relational structure in which that content is placed.

5.3 Leverage as Multiplication and Leverage as Topological Transition

Leverage is generally understood as a quantitative multiplier.

One unit of capital enables ten units of transaction.

One unit of input generates one hundred units of output.

One post reaches a million people.

This understanding is important. Yet leverage in language and art cannot be grasped through simple quantitative increase alone.

Even if one word is repeated one hundred times, if its meaning does not change qualitatively, only quantitative amplification has occurred.

By contrast, when a single word changes the receiver's very understanding of the world, a topological transition has occurred.

A person may encounter an artwork and begin to perceive as a problem something that they had never previously recognized as problematic. Such a change is not an increase in the amount of information. It is a transformation in the cognitive structure that determines what counts as important information.

This paper therefore distinguishes two forms of leverage.

The first is **quantitative leverage**: a structure in which the amount, range, speed, or frequency of output is amplified relative to input.

The second is **topological leverage**: a structure in which input changes the very dimension of meaning, value, relation, or recognition.

Generative AI possesses quantitative leverage when it produces long texts from short prompts. At the same time, when it presents concepts or relations that the user had not conceived and changes the framework of thought, it possesses topological leverage.

The essential force of art lies primarily in the latter.

5.4 What Is Information?

Information is generally understood as transmitted content or as a difference that reduces uncertainty.

Yet information does not possess fixed meaning in itself.

The same number, word, or image changes meaning and value according to context, receiver, time, and institution.

The word "danger" acts differently depending on who utters it, when, and in what situation.

Information that a share price has fallen means something different for a long-term investor, a short-term speculator, a company employee, and a consumer.

A text generated by artificial intelligence likewise requires different levels of accuracy and responsibility when used as assistance for creative writing than when used as a basis for medical judgment.

Information is therefore not isolated content, but an event that acts within a relation by introducing difference.

This paper understands information as follows:

Information is an operation that introduces a difference into a relational system and changes possibilities of judgment, meaning, or action within that system.

Within this definition, information is not simply data.

Even when data exists, if no difference is produced, it does not operate as information in a practical sense.

Conversely, an extremely short word can possess high informational leverage if it fundamentally changes human judgment.

5.5 Information Quantity and Information Value

The quantity of information and the value of information are not identical.

A long text does not necessarily possess high value. A large amount of data does not necessarily enable important judgment.

Information quantity may sometimes be measured as the scale of signs or choices. Information value, by contrast, depends on what difference the information generates for a particular subject, situation, and time.

A single sentence indicating an evacuation route during a disaster may possess greater value than a vast body of general knowledge.

A single concept explaining an experience that a person has been unable to understand for years may reorganize that person's entire life.

Information value arises through relations such as:

**Information content

+ Urgency of situation

+ Relevance to receiver

+ Connectability to action**

Informational leverage is therefore not achieved merely by increasing information quantity.

What matters is which information, when connected to which subject and situation, generates what degree of difference.

5.6 Compression and Expansion of Information

Informational leverage can be understood through the relation between compression and expansion.

Words, equations, images, and symbols compress complex relations into limited forms.

A single equation expresses numerous individual cases as one relational form.

A single concept classifies diverse experiences and makes them comparable.

A single waka poem compresses body, season, memory, relation, and history into a limited number of sounds.

Compressed information is then expanded again within the receiver.

That expansion, however, is not a simple restoration of original content. Different meanings are generated according to the receiver's experience, knowledge, emotion, and situation.

Informational leverage is therefore:

a structure in which a compressed sign, by connecting to the receiver's latent relational resources, unfolds meanings exceeding the input.

A prompt to artificial intelligence possesses the same structure.

A short input activates an immense trained relational space and unfolds into a long text.

5.7 Information and the Fulcrum

The same information has different influence depending on the fulcrum through which it circulates.

Possible fulcrums include:

authority;

expertise;

institutions;

media;

frequency of repetition;

algorithms;

emotional intensity;

collective trust;

visual form;

urgency.

The same sentence has a different social effect when spoken anonymously and when announced by a public institution.

When artificial intelligence answers in an assertive tone, that form becomes a fulcrum of authority.

When a social-media recommendation algorithm repeatedly displays a particular post, repetition itself produces an impression of importance.

The force of information is not determined only by the truth of the content. It depends on through what interface it is made visible, to whom it reaches, how frequently, and in what form.

Informational leverage therefore always contains political and institutional questions.

5.8 Information Leverage and Misinformation

Informational leverage does not amplify only accurate information.

Rather, information that is short, simple, emotionally intense, and compatible with existing narratives can sometimes possess greater power of diffusion.

Complex facts require many conditions and qualifications. Misinformation, by contrast, can present simple causal relations and clear divisions between allies and enemies.

Factual validity and amplifiability therefore do not coincide within information space.

The same mismatch exists in AI hallucination.

A plausible, clear, and systematic wrong answer may make a stronger impression on the user than a cautious answer that honestly displays uncertainty.

Information ethics must therefore ask not only whether information is correct, but what leverage it acquires, how far and how quickly it spreads, and with what effects.

5.9 Does AI Generate Information?

Generative AI is commonly understood as an apparatus that generates information.

Strictly speaking, however, artificial intelligence does not always generate new facts.

It reconstructs relations learned from existing data and generates new sentences according to input context.

Whether that output becomes new information cannot be determined by the output alone.

If it merely paraphrases what is already known, the sequence of signs may be new while the epistemic difference is small.

If, however, it rearranges existing knowledge into new relations and reveals problems or possibilities the user had not previously found, the output functions as new information.

Artificial intelligence therefore does not create information ex nihilo. It actualizes latent relations.

Information generation by artificial intelligence can be defined as:

the extraction and construction, from an existing symbolic relational space, of relations that can act as new differences in accordance with a particular input and context.

5.10 Asymmetry Between Input and Output in AI

One of the clearest characteristics of generative AI is the asymmetry in scale between input and output.

A few words of prompting can generate a long paper, story, program, plan, or image.

Artificial intelligence does not, however, generate all of this from those few words alone.

The prompt is a point of action upon an immense latent relational space formed through training.

The leverage structure of artificial intelligence can therefore be expressed as:

**Small prompt

+ Immense trained relational space

+ Inference algorithm

+ Conversational context

-> Large-scale generated output**

The prompt is not the original resource. It is the condition of activation.

This point is important both when AI output is regarded as an individual's creation and when it is regarded as the creation of artificial intelligence alone.

Output is constituted through the combined action of user instruction, model design, training data, computational resources, and institutional environment.

5.11 Prompt Leverage

A prompt is both a sentence that gives an instruction to artificial intelligence and a position that gives direction to the generative space.

What object is presupposed?

What style is specified?

What role is assigned to artificial intelligence?

What conditions are stated, and what is omitted?

Differences in these factors greatly alter the result of generation.

Prompt leverage does not depend on length alone.

A short prompt with strong presuppositions may direct the generative space narrowly.

A detailed prompt can constrain output precisely, but may also more strongly fix the user's presuppositions and biases.

A prompt is therefore not a neutral question. It is a speculative position that determines which future linguistic sequences will be privileged.

Prompt design is, in this sense, the design of Language Leverage.

5.12 AI and the Creation of Credit in Meaning

Within financial systems, credit enables transactions and investments exceeding assets presently possessed.

Generative AI possesses a structurally analogous creation of credit in meaning.

Users may receive text presented by artificial intelligence as temporarily usable meaning even when they cannot fully verify it at that moment.

Artificial intelligence presents explanations, causal relations, hypotheses, and textual structures that exceed the explicitly supplied evidence.

AI is therefore not merely circulating already established knowledge. It supplies unverified meaning in advance in a usable form.

This structure can be called **the creation of credit in meaning**.

Credit creation in meaning accelerates thought and production.

Users can obtain a hypothetical overall picture and move to the next stage of investigation without researching everything from the beginning.

Credit, however, requires repayment or settlement.

Settlement in linguistic meaning consists of factual checking, logical verification, embodied practice, dialogue with others, and comparison with real outcomes.

If unverified credit in meaning accumulates, linguistic debt expands.

Hallucination can also be understood as a condition in which unsettled meaning circulates as though it were an already established asset.

5.13 AI and the Leverage of Hallucination

AI hallucination is dangerous because one error does not necessarily remain one error.

A false premise is entered.

Artificial intelligence supplements that premise.

The supplemented content becomes a premise for subsequent generation.

A coherent narrative is formed.

The user cites or shares it.

Another subject uses the information as an underlying asset.

In this process, one misrecognition produces numerous derivative misrecognitions.

The leverage of AI hallucination therefore possesses at least three stages.

The first is **generative leverage**: a large fiction is generated from a short false premise.

The second is **authority leverage**: the fluency and formal structure of artificial intelligence give generated content an appearance of credibility.

The third is **circulation leverage**: generated output is quoted, shared, retrained upon, and becomes a basis for further information generation.

When these three stages overlap, a local error expands into a social information structure.

5.14 The Duality of Leverage in AI

The leverage of artificial intelligence is both liberating and dangerous.

On its liberating side, AI expands access to specialist knowledge, writing, translation, analysis, and creation.

Individuals with limited time and resources can perform tasks that previously required organizational support.

On its dangerous side, AI can rapidly amplify misinformation, bias, superficial authority, dependency, and homogenization of thought.

The important point is that the higher the leverage, the more important human judgment becomes - not less.

In high-leverage systems, small differences in judgment produce large differences in results.

The more capable artificial intelligence becomes, the more precisely human beings must decide what to delegate, what to verify, and what responsibility to assume.

5.15 The Basic Structure of Financial Leverage

Financial leverage combines one's own capital with borrowed capital or derivative instruments to create market exposure exceeding the capital actually held.

Simplified, the leverage ratio can be understood as the relation of total assets or market exposure to equity.

What concerns this paper, however, is less the ratio itself than its ontological structure.

Financial leverage forms in the present a position toward future profit possibilities exceeding currently held capital.

Unrealized future profit is thus folded into present judgment and value.

Losses are amplified as well.

Leverage is not a device that increases only profit. It increases sensitivity to future fluctuation.

The essence of financial leverage therefore lies in forming, through limited equity, a large present relational position toward future price movements.

5.16 Leverage and the Separation of Ownership

Financial leverage enables large involvement in value fluctuation without direct ownership of the entire object.

In derivatives trading, a position can be formed toward price changes without possessing the underlying asset itself.

Ownership of the object and participation in its fluctuation are separated.

The same structure exists in Language Derivatives.

A user can, through artificial intelligence, generate and use the language of a scholarly field without possessing the entire knowledge of that field.

A person can reconstruct linguistic forms of a culture or experience without having embodied or lived that culture or experience.

This separation expands access to knowledge and expression.

At the same time, it generates a danger: participation in linguistic effects without possessing the experience, responsibility, or understanding in which those effects are grounded.

Just as a financial position without ownership of the underlying asset can generate large gains or losses, speech ungrounded in experience can possess large social effects.

5.17 Margin and the Prompt

Financial derivatives make it possible to hold a position exceeding the amount deposited as margin.

A prompt possesses a structurally similar relation within language generation.

The user provides a short input and receives a large generative result exceeding it.

The two, however, cannot be directly identified.

Financial margin is legal and economic collateral against loss.

A prompt does not necessarily collateralize responsibility for generated output.

Indeed, in artificial intelligence, the attention, knowledge, and responsibility invested by the user may be extremely small relative to the scale of output.

This imbalance is crucial.

Language Leverage may be high while the margin of responsibility remains low.

It becomes possible to generate and publish large quantities of text and influence others while assuming little responsibility for checking or owning the generated content.

The age of artificial intelligence therefore requires an **epistemic margin** or **responsibility margin** in place of financial margin.

This is realized not in money but through source verification, disclosure of the generative process, revisability, restrictions on use, and the sender's assumption of responsibility.

5.18 Financial Leverage and Time

Financial leverage connects present capital to future price fluctuation.

A position is taken now in expectation of future profit. Expectation changes current demand, and current prices change.

Financial leverage therefore intensifies the temporal structure through which the future is folded into the present.

Before profit is realized in the future, its possibility is evaluated as present value.

If the future differs from prediction, however, a present position can rapidly turn into loss.

Leverage compresses time.

Changes in value that might have occurred gradually across the future are anticipated in present price movements.

Artificial intelligence likewise compresses the time previously required for thinking, research, and writing.

Art, too, compresses long histories and experiences into a work and presents them to the viewer as an instantaneous encounter.

Leverage therefore amplifies not only quantity but also compresses time.

5.19 Financial Leverage and Risk

Leverage expands both the possibility of profit and the possibility of collapse.

A price change that could be tolerated under equity alone may destroy the entire capital base when leverage is high.

The danger of leverage therefore lies not only in the possibility that prediction is wrong.

It lies in sensitivity: a small predictive error becomes a large loss.

Language Derivatives possess the same problem.

If a factual error remains in a private note, its effect is limited.

If the same error is amplified through artificial intelligence, authority, social media, and institutions, it may generate a large social loss.

Risk is therefore determined not only by the size of an error, but by the leverage applied to it.

5.20 Settlement and Reality Grounding

Financial positions are ultimately settled through market prices, contracts, and payment.

The difference between expectation and reality appears as profit or loss.

Language Derivatives likewise require a process corresponding to settlement.

Predictions are tested against actual events.

Hypotheses are tested through experiment.

AI output is compared with source materials.

Artistic concepts encounter the resistance of production and viewing.

What this paper calls Reality Grounding is also a settlement process that makes visible the difference between linguistic possibility and reality.

Language and art, however, do not always possess a single final moment of settlement as finance does.

The meanings of theories and artworks may be reevaluated by later generations. New contexts change value.

Settlement in Language Derivatives is therefore not a one-time conclusion, but continuing verification and reconnection.

5.21 Information Space as Financialization

Information space becomes financialized when information ceases primarily to serve understanding of reality and is treated instead as a derivative asset for amplifying attention, evaluation, and influence.

The value of a statement is judged not by its content but by how far it spreads.

A person's authority is formed less by actual achievement than by citation counts, follower numbers, and media exposure.

As artificial intelligence generates massive quantities of text, occupying information space may become more important than understanding content.

In this condition, information functions not as a connection to reality but as collateral for generating more information.

Words generate words, evaluations generate evaluations, and attention generates attention.

This is the self-circulation of leverage within information space.

5.22 Leverage in Art

Art also generates immense meaning and experience from limited form.

One painting.

One object.

A short poem.

A single performance.

A limited spatial arrangement.

These may be physically small. Yet they activate the viewer's memory, emotion, historical recognition, bodily sensation, and social relations.

Art is therefore inherently structured by leverage.

Artistic leverage does not mean that a large amount of meaning is stored inside the work.

The work is a fulcrum that acts upon the latent relational resources of viewers and society.

There is an asymmetry between the smallness of the work and the magnitude of experience.

This paper defines **artistic leverage** as follows:

Artistic leverage is a structure in which a limited material or symbolic configuration, through connection with body, memory, history, others, and place, generates perceptual, social, or ontological transformations irreducible to the input.

5.23 The Artwork Is Not a Container of Meaning

If the work is understood as a container of meaning, then the artist is imagined to put meaning inside the work and the viewer to take it out.

Artistic leverage cannot be explained through this transmission model.

The effect of a work may exceed the quantity of meaning intended by the artist.

A viewer may have an experience the artist never predicted. A later society may reinterpret the work from a context that did not exist when it was produced.

The work does not merely preserve meaning. It activates the generation of meaning.

The work is therefore not a warehouse of information, but a fulcrum that activates relations.

Meaning is generated in the connection among work, viewer, place, time, and institution.

This structure resembles the prompt in artificial intelligence.

Just as a prompt activates an immense linguistic space, a work activates the latent semantic space of viewers and society.

An artwork, however, retains material resistance, placeness, historicity, and the bodily time of its maker. In this respect, it differs from purely linguistic generation by artificial intelligence.

5.24 Art and Quantitative Amplification

Leverage in art can appear as the ability of a work to reach many human beings.

Technologies of reproduction, publishing, photography, film, broadcasting, and the Internet circulate a work across broad areas.

Digital technologies and artificial intelligence further increase this quantitative leverage.

A single maker can generate many images, texts, sounds, and video ideas in a short time and publish them globally.

This quantitative leverage broadens participation in artistic production.

Yet greater circulation does not automatically mean greater artistic value.

Some works deepen in meaning through repetition; others are consumed through excessive circulation and lose difference.

Quantitative leverage must therefore be distinguished from artistic leverage.

To be seen by many and to transform the seeing subject are not the same thing.

5.25 Art and Topological Leverage

Leverage specific to art is **topological leverage**.

Through encountering a work, the viewer does not merely acquire new information. What the viewer perceives as reality itself changes.

What had remained background appears as foreground.

What had seemed meaningless becomes an urgent problem.

Others or nature once considered unrelated to the self are experienced as conditions of the self's own existence.

The work here does not simply increase value inside an existing cognitive space. It changes the boundary of that cognitive space itself.

Such change is difficult to measure as a multiplier.

Yet the deepest amplification in art lies not in quantity of meaning but in transformation of the topology of being.

5.26 The Difference Between Art and Information

Art contains information, but cannot be reduced to information transmission.

In information transmission, accurate sharing of content between sender and receiver is emphasized.

In art, by contrast, failure of transmission, ambiguity, silence, discomfort, and interpretive discrepancy can play crucial roles.

An artwork may generate a difference that existing understanding cannot process rather than efficiently transmit known content.

Artistic leverage therefore not only clarifies information, but makes appear what had not been able to become information.

Artificial intelligence tends to transform ambiguous input into coherent language.

Inverse Problem Art, by contrast, preserves discomfort and non-solvability concealed by coherent language.

This difference is important for understanding the relation between art and artificial intelligence.

5.27 Art Markets and Financial Leverage

Artworks generate ontological transformation while also possessing financial value in markets.

In art markets, not only the material content of a work but also expectations concerning the artist's future evaluation, rarity, exhibition history, criticism, provenance, and institutional recognition are folded into price.

The future art-historical position of a work affects present price.

The art market therefore forms a clear Derivative Space.

A single exhibition, review, or award can significantly change the market value of an artist as a whole.

This is Narrative Leverage.

Market value and artistic value, however, are not identical.

Market price is formed through future expectations, rarity, liquidity, and institutional evaluation.

Artistic value concerns what kinds of perception, relation, and existential transformation a work generates.

The two may connect, but they do not necessarily coincide.

5.28 Excessive Leverage in Art

Art also possesses excessive leverage.

This occurs when disproportionately large historical or social meaning is assigned to limited practice or achievement.

Titles, institutions, media, and theoretical discourse may amplify the value of artists and works while losing connection with the works themselves.

At that point, narrative no longer explains the work; the work is used as evidence supporting the narrative.

When artistic practice lacking sufficient Reality Grounding is excessively amplified through words such as "innovative," "socially transformative," "scientific," or "futuristic," bubbles can form in art space as well.

The problem is not high evaluation itself.

The problem is the emergence of an irreparable divergence between symbolic evaluation and the experiences or relations actually generated by the work.

5.29 Art and Reality Grounding

Reality Grounding is required if artistic leverage is not to become self-contained fantasy.

A work encounters resistance from material, body, place, time, others, and institutions.

A concept changes in production. Meaning changes through exhibition space. Viewer response modifies the maker's own understanding.

Reality Grounding is not an external condition that restricts artistic freedom.

It is the condition through which a work can exceed the maker's own imagination.

Without the resistance of reality, a work merely repeats the maker's already known world.

Artistic leverage therefore requires both movement away from reality and movement back toward reality:

**Topological difference from reality

-> Amplification of possibility

-> Production and encounter

-> Resistance of reality

-> Topological transition**

5.30 Art and Self-Externalization

Making a work is an act of placing sensations, thoughts, and desires of the self outside the self.

The externalized work, however, is not a perfect copy of the self.

Through resistance of material, contingency in production, interpretation by others, and the conditions of place, the work deviates from the artist's intention.

This deviation produces artistic leverage.

If the work merely reproduced the artist's interior exactly, the artist could only see the self already known.

When the work returns as what is other than the self, the artist encounters a self they did not know.

Artistic leverage is therefore not the expansion of the self.

It is the transformation of the boundary of the self through the failure of Self-Externalization.

5.31 Leverage in AI Art

In artistic production using artificial intelligence, the leverage structure becomes extremely high.

From a short prompt, many images, texts, sounds, and moving-image proposals can be generated.

Speed and range of production increase dramatically.

This quantitative leverage broadens possibilities of participation in art-making.

Yet an increase in generated quantity does not necessarily deepen the ontological involvement of the maker.

Without selection, editing, placement, and grounding in reality, generated outputs remain an array of possibilities.

The problem of AI art does not lie in the binary question of whether artificial intelligence can create.

It lies in which differences are assumed among the mass of generated possibilities, to what realities they are connected, and who bears responsibility for their consequences.

The value of AI art should therefore be evaluated not by the quantity of generation, but by how leverage is connected to topological transition.

5.32 Common Structures of Leverage Across Four Domains

Information, artificial intelligence, finance, and art share the following structure.

First, there is a limited input.

A difference in information.

A prompt in artificial intelligence.

Equity or margin in finance.

A work or gesture in art.

Second, there is an interface functioning as a fulcrum.

Media and institutions in information.

Models and dialogue screens in artificial intelligence.

Markets and contracts in finance.

Works, exhibition spaces, and institutions in art.

Third, there are latent resources.

Social memory.

Training data.

Market liquidity.

The viewer's experience and history.

Fourth, effects exceeding the input arise.

Information diffusion.

Large-scale generation.

Profit or loss.

Transformation of perception or being.

Fifth, there is a possibility of collapse through failure of grounding.

Misinformation.

Hallucination.

Financial collapse.

Hollowing-out of artistic authority.

Through this shared structure, leverage becomes a theoretical concept traversing all four domains.

5.33 Decisive Differences Across the Four Domains

Despite common structure, the four domains cannot be identified with one another.

Leverage in information is the amplification of differences that change judgment and action.

Leverage in artificial intelligence rapidly activates symbolic relational space and performs large-scale generation.

Leverage in finance forms market exposure exceeding capital and amplifies monetary gain and loss.

Leverage in art changes perception, meaning, and the relation between self and world through a work.

In finance, profit and loss are measured in currency.

In information, leverage is evaluated through range of influence and changes in judgment.

In artificial intelligence, quantity of generation, accuracy, usefulness, and danger become issues.

In art, the very measure of value may be changed by the work.

Artistic leverage therefore cannot be reduced to a financial multiplier.

Art does not merely increase existing value. It can change what counts as value.

5.34 Leverage and Interface

Leverage is not an attribute contained within input itself.

It arises according to what latent resources the input becomes connected to and through what interface.

A word has no social leverage if it reaches no one.

A prompt is merely a sentence if it is not connected to a generative model.

Capital cannot form a large position without connection to markets and credit systems.

A work does not generate an artistic event without connection to bodies, places, viewers, and history.

The interface is therefore the fulcrum of leverage.

Yet the interface does not only amplify. It determines direction, range, speed, and responsibility of amplification.

The ethics of leverage is therefore also an ethics of interface design, not merely an ethics of input content.

5.35 Leverage and Reality Grounding

High leverage requires high Reality Grounding.

This is because small errors are transformed into large consequences.

Finance requires collateral, margin, risk management, and settlement systems.

Artificial intelligence requires source verification, displays of uncertainty, restrictions on use, and human oversight.

Information spaces require verification, rebuttal, correction, and access to multiple perspectives.

Art requires contact with material, body, place, others, and history.

Reality Grounding is not meant to reduce leverage.

It is the condition through which amplified possibility touches reality, is corrected, and becomes sustainable transformation.

5.36 Leverage and the Asymmetry of Responsibility

In contemporary information society, leverage of effects expands while responsibility does not expand at the same rate.

One person's communication reaches many people.

One item of misinformation is automatically reproduced.

A single prompt generates and publishes large amounts of text.

A single financial decision affects society as a whole.

Yet the sender or user may neither recognize nor assume the full range of effects.

This can be called **inverse leverage of responsibility**.

Effects are amplified, while responsibility is distributed or reduced.

"AI generated it, so it is not my responsibility."

"The market decided, so no one is responsible."

"The algorithm recommended it, so there was no intention."

"The institution evaluated it, so the work itself need not be examined."

This disappearance of responsibility is the greatest ethical danger of leverage structures.

5.37 Responsible Leverage

Leverage cannot be rejected altogether.

The development of information, technology, finance, and art is supported by leverage that generates large possibilities from limited resources.

What is required is to connect leverage to responsibility and grounding.

This paper calls this **Responsible Leverage**.

Responsible Leverage has at least five conditions.

First, **visualization of the amplification structure**: indicate what the input is and what media or institutions amplify its effects.

Second, **disclosure of uncertainty**: do not disguise generated output or prediction as established fact.

Third, **Reality Grounding**: compare with sources, bodies, practice, others, and institutions.

Fourth, **revisability**: preserve the ability to change generated outputs, positions, and narratives in response to error or new reality.

Fifth, **responsibility for effects**: do not deny responsibility for amplified consequences on the grounds that the original input was small.

5.38 The Ontology of Leverage

Leverage is not merely technical efficiency.

It reveals that being acquires force not as an isolated substance, but through connection with latent relations.

A small thing possesses a large effect not because immense force is enclosed within it.

It does so because it becomes connected to a relational space beyond itself.

A word connects to the history of a linguistic community.

A prompt connects to the learning space of artificial intelligence.

Capital connects to credit and markets.

A work connects to bodies, history, place, and viewers.

Leverage is therefore a form in which the latent power of relations becomes manifest.

From this perspective, the force of being is not determined only by the quantity possessed internally by the self. It is determined by what the self is capable of connecting to.

This is consistent with the proposition in Generative Topological Ontology that **being is connectability**.

5.39 Leverage and Ternary Generation

Leverage is not a binary relation in which input A acts one-directionally upon object B.

When input A and latent relational space B connect through an interface, an effect C irreducible to either is generated.

A x B -> C

Prompt A and the linguistic space of artificial intelligence B generate text C.

Capital A and market B generate position and profit/loss C.

Artwork A and viewer/place/history B generate artistic experience C.

Information A and social context B generate judgment or collective action C.

C was not content possessed independently by A.

Leverage is therefore not merely amplification but **ternary generation**.

5.40 Leverage and What Is Other Than the Self

Leverage requires resources that are other than the self.

A human being using artificial intelligence connects to linguistic accumulation they do not own.

An investor connects equity to the liquidity of the market as a whole.

An artist connects production to material, others, history, and place.

A communicator connects to receivers' memories, desires, fears, and existing narratives.

Leverage is therefore simultaneously a technique of expanding the self and a structure of using what is other than the self.

An ethical problem arises here.

If what is other than the self is treated only as a resource for amplifying the self's effects, connection becomes extraction.

We must ask: whose benefit is served when AI training data, others' works, social trust, natural resources, and others' labor are incorporated into systems of amplification?

5.41 Leverage and the Ethics of Art

Artistic leverage can also make use of the experiences of others, history, and communities.

When social suffering or another person's wound is used as material and converted into the artist's evaluation, another person's reality may become Narrative Leverage for the artist.

Inverse Problem Art must avoid such one-directional use.

Connection with what is other than the self must preserve difference and resistance.

Do not claim to understand another person's experience completely.

Do not overclaim that a work has solved a social problem.

Ask to whom the social value generated by the work is returned.

Respond to the effects the work has upon others.

The ethics of art does not mean eliminating leverage. It means making visible its fulcrums and distributions of benefit.

5.42 Definition of the Leverage Structure

On the basis of the preceding discussion, this paper defines the Leverage Structure as follows:

The Leverage Structure is an asymmetric and recursive structure in which limited information, capital, language, artwork, or action, by connecting through an interface to latent relational resources, generates quantitative or topological effects irreducible to the input.

This definition contains seven elements.

First, a limited input exists.

Second, an interface exists that connects input to latent resources.

Third, asymmetry arises between input and output.

Fourth, amplification may be quantitative or topological.

Fifth, generated output possesses recursion, becoming a new input or underlying asset.

Sixth, when Reality Grounding is lacking, misinformation, hallucination, financial collapse, or hollowing-out of authority occurs.

Seventh, when grounding and responsibility are established, knowledge, creation, collaboration, and existential transformation are generated.

5.43 Chapter Summary

This chapter examined the Leverage Structure, the central mechanism of the Theory of Language Derivatives, across the four domains of information, artificial intelligence, finance, and art.

Leverage is not merely a quantitative multiplier. It is an asymmetric amplification structure in which a limited input connects through an interface to latent relational resources and produces effects irreducible to the input.

In information, one difference changes the judgment and action of the receiver. The value of information is determined not only by information quantity but by urgency, relation to the receiver, and connectability to action.

In artificial intelligence, a short prompt activates an immense trained relational space and produces large-scale generated output. AI does not create meaning from nothing; it is an apparatus of Language Leverage that unfolds latent relations into a present context.

Artificial intelligence also creates credit in meaning. Unverified meaning is supplied as a temporarily usable whole. If this credit is not settled through Reality Grounding, hallucinations accumulate.

Financial leverage forms, through limited equity, a large present position toward future price fluctuation. It amplifies both profit and loss and transforms small predictive errors into large consequences.

Language space has comparable sensitivity. If one misrecognition is amplified through artificial intelligence, authority, media, and institutions, a local error can change social reality.

Leverage in art is the structure through which a limited work, by connecting to body, memory, history, place, and others, generates perceptual, social, and ontological transformation.

Leverage specific to art is not simply an increase in meaning or circulation. It transforms the topology that determines what counts as meaning, value, and reality.

Across the four domains, common elements are limited input, an interface functioning as fulcrum, latent resources, asymmetric effects, and the possibility of collapse through grounding failure.

Their value measures and final effects nevertheless differ. Finance centers monetary gain and loss; information centers change in judgment; artificial intelligence centers symbolic generation; art centers topological transition of being.

The question of leverage is therefore not whether amplification occurs.

What is amplified?

What relational resources are used?

Who benefits, and who bears the risk?

How are amplified possibilities grounded in reality?

Who takes responsibility for the result?

These questions are essential.

Within the Theory of Language Derivatives, leverage is a shared structure prior to the distinction between creativity and hallucination.

Leverage without Reality Grounding and responsibility produces misinformation, bubbles, extraction, and self-closure.

Leverage that preserves topological difference while reconnecting to body, others, institutions, and reality, by contrast, becomes a force through which the self encounters what is other than itself and generates new reality.

Chapter 6

Integration with Generative Topological Ontology

Self-Externalization, Pre-Humanity, Interface Ontology, and Reality Grounding

6.1 Introduction

This chapter integrates the Theory of Language Derivatives developed thus far into the theoretical system of Generative Topological Ontology.

In the preceding chapters, this paper has understood hallucination in generative AI not merely as misinformation, but as derivative language generation lacking Reality Grounding. It has also analyzed AI language generation as an inverse-problem structure that estimates a latent whole from incomplete input, and has shown that its generative force shares a leverage structure with art, finance, narrative, and information space.

If these discussions remain at the level of comparison among individual domains, however, the Theory of Language Derivatives would amount only to an interdisciplinary metaphor that discovers similarities among finance, artificial intelligence, and art.

The purpose of this paper is deeper than that.

The issue is why language, while deriving from reality, can generate possibilities that exceed reality.

Why can human beings speak, as their own words, words that did not already exist within them?

Why can artificial intelligence generate coherent sentences about reality even though it has not experienced reality?

Why can a work of art exceed the artist's intention and make an unknown self appear to the viewer?

Why can a narrative about the future alter present action from a future that does not yet exist?

What these questions share is a structure in which being is not complete as a fixed substance but is generated through connection with what is other than itself.

Generative Topological Ontology understands being not as a closed identity, but as a process of relation, connectability, boundary transformation, and the generation of a third term.

From this perspective, a Language Derivative is not a secondary representation added outside being. It is one form through which being externalizes itself and, through a topological difference from what is other than itself, generates a new self and a new reality.

This chapter first redefines Self-Externalization as a condition of existential generation. Second, it examines Pre-Humanity - that which precedes the self and the human - as a ground of language and artificial intelligence. Third, it positions Interface Ontology as the theory connecting Self-Externalization and Pre-Humanity. Fourth, it integrates Reality Grounding as the condition through which derivative possibility is transformed into existential generation.

6.2 Fundamental Propositions of Generative Topological Ontology

Generative Topological Ontology understands being not as a completed substance, but as a relational structure that continually changes through connection.

Its fundamental propositions may be summarized as follows.

First, relation precedes substance.

Entities do not first come into being independently and only afterward enter into relations. An entity appears as a particular being through its relations with others, environment, body, language, and time.

Second, being is connectability.

The force of being is not determined only by the totality of attributes possessed internally. It is determined by what a being can connect with and what kinds of relations can be generated through those connections.

Third, boundaries are not fixed.

The boundaries between self and non-self, subject and object, inside and outside, reality and fiction, human being and artificial intelligence are not permanently determined in advance. With every connection, the position and meaning of a boundary change.

Fourth, connection generates a third term.

When two different terms, A and B, come into contact, C is generated as something more than their simple sum.

$$A \times B \rightarrow C$$

C cannot be completely reduced either to A or to B.

Fifth, generation has no terminal point.

The generated C becomes a new A or B in a subsequent connection. Being does not proceed toward completion; it continues recursive connection.

Within this theoretical framework, Language Derivatives are understood not as secondary signs derived from being, but as topological operations through which being acquires new connectabilities.

6.3 Not Language Derived from Substance, but Being Derived through Language

In conventional theories of representation, it is assumed that an object of reality first exists and that language then represents that object.

Real object -> cognition -> linguistic representation

Within this model, language is positioned after an already established reality.

Language certainly has a function of describing reality. Human reality, however, is not merely described by language; it is also constituted through language.

A promise generates a relation that does not yet exist.

Law institutionalizes possibilities and prohibitions of action.

A name transforms an object into a socially identifiable being.

A diagnosis locates bodily experience within a medical reality.

An artistic manifesto organizes existing practices as a new artistic movement.

A prompt generates an AI response that did not previously exist.

Here language is not a representation added after reality.

Language changes the connective structure of reality and derives new being.

Generative Topological Ontology must therefore consider two directions simultaneously:

Reality -> Language

and, at the same time,

Language -> New Reality

A Language Derivative is a generative structure formed in the interval between these two directions.

6.4 What Is Self-Externalization?

Self-Externalization is the placing of the self's sensations, thoughts, memories, desires, and intentions outside itself as language, works, actions, institutions, records, or outputs of artificial intelligence.

Human beings cannot directly hand over what is inside themselves to another person just as it is.

Thought is transformed into words.

Sensation is transformed into gesture or artwork.

Memory is transformed into record.

Intention is transformed into institution or contract.

Only through externalization does the self become shareable with others, persist across time, and become recognizable again even to itself.

Self-Externalization is therefore not a contingent expressive act of human beings. It is a fundamental condition for the self to come into being as self.

By hearing one's own words, one comes to know what one had been thinking.

After making a work, one may realize what one had been trying to make.

Through the response of others, one discovers the difference between one's intention and its effect.

By reading a text returned by artificial intelligence, one may discover assumptions contained in one's own question.

The self, in other words, does not completely possess itself prior to externalization.

The self is generated through a renewed encounter with the self that has been externalized.

6.5 The Paradox of Self-Externalization

Self-Externalization contains a fundamental paradox.

To externalize the self, what is within the self must be transformed into words or forms.

Yet at the moment it is transformed, it is no longer the self itself.

Words are not thought itself.

A work is not the artist itself.

A record is not experience itself.

An AI response is not the user's thought itself.

What has been externalized derives from the self, but is not identical with the self.

This difference makes externalization possible. At the same time, this difference makes complete Self-Externalization impossible.

Self-Externalization therefore does not mean moving the self completely outside itself.

It means:

generating what is other than the self, derived from the self yet irreducible to it.

In this sense, Self-Externalization itself possesses a derivative structure.

The self resembles an underlying asset, but externalized language or artwork is not a simple copy of the self. Such products are derivatives composed from a part of the self together with social forms, interpretations by others, constraints of media, and historical context.

6.6 The Failure of Self-Externalization and the Generation of Being

The failure of Self-Externalization is commonly understood as the failure to transmit an intention accurately.

Generative Topological Ontology, however, does not treat this failure merely as a defect.

If what is externalized were to reproduce the inside of the self perfectly, externalization would remain no more than a duplication of the self.

No new being would be generated.

A work exceeds the artist's intention.

Words acquire unexpected meanings.

Others return different interpretations.

Artificial intelligence transforms the input.

Material resists a conception.

Through this non-coincidence, the self encounters something it did not possess in advance.

The failure of Self-Externalization is therefore a condition of existential generation.

Self

-> Externalization

-> Deviation from the Self

-> Encounter with What Is Other Than the Self

-> Generation of a New Self

This process corresponds to the structure of Inverse Problem Art.

From the work, response, or failure that has appeared, the self retrospectively discovers its own previously unknown assumptions and possibilities.

6.7 Self-Externalization as a Language Derivative

Language that has been externalized from the self does not simply display the self's interiority.

Words employ socially shared vocabulary, grammar, history, and relations of power.

What is other than the self is therefore already contained within the self's words.

A person speaks in their own words, but they did not create those words alone.

Language is inherited from others in the past, transformed by present situations, and passed to recipients in the future.

In this sense, every utterance is a derivative situated between the individual and the human community.

Furthermore, once spoken, words separate from the speaker and derive new meanings through quotation, translation, summary, criticism, and regeneration by artificial intelligence.

Self-Externalization through language is therefore not a one-time act of expression.

It is a recursive process in which words derived from the self generate further derivatives in spaces other than the self.

6.8 The Acceleration of Self-Externalization by Artificial Intelligence

Generative AI accelerates and amplifies Self-Externalization.

The user enters fragmentary words, and artificial intelligence expands those fragments into long texts, structured theories, stories, images, and plans.

In this process, Self-Externalization is extended beyond forms directly produced by the user.

Artificial intelligence can appear to act on behalf of the user's thought. In fact, however, it connects the user's input to an immense accumulation of language and generates a derivative between the user's self and the social linguistic space.

The generated product is both the self's language and language other than the self.

Here lies the distinctive character of Self-Externalization through artificial intelligence.

An AI output cannot be regarded completely as the expression of the self.

At the same time, it cannot be regarded completely as the words of an external other.

It is a third term generated through the connection among the self, the model, training data, the prompt, institutions, and conversational history.

6.9 The Closure of Self-Externalization

Self-Externalization through artificial intelligence carries a danger of closure.

The user inputs their own premises.

Artificial intelligence generates text in accordance with those premises.

The user receives that text as an objective judgment from outside.

Through that judgment, the user further reinforces their own premises.

In this circulation, the self appears to be encountering what is other than itself while in fact amplifying its own premises.

Artificial intelligence becomes not an interface to what is other than the self, but a closed circuit of Self-Externalization.

This is also a personal form of hallucination.

Hallucination is not limited to generating false facts.

When the self's premises are returned as external authority and the self is closed by those derivative words, an ontological hallucination also occurs.

Dialogue with artificial intelligence therefore requires more than efficient self-expression.

It requires the design of interfaces that resist the self's premises, return difference, and make visible the failure of Self-Externalization.

6.10 What Is Pre-Humanity?

Pre-Humanity refers to the existential conditions already at work before human beings recognize themselves as human and define themselves through language.

It does not mean only a chronological period before human history.

Pre-Humanity also exists within each person's present, preceding cognition, judgment, and linguistic articulation.

The body breathes, adjusts posture, and responds to its environment before conscious command.

Sensation receives brightness and darkness, sound, pressure, temperature, and distance before classifying objects conceptually.

Before acquiring their own language, human beings are formed through the voices, facial expressions, bodily contact, and spatial arrangements of others.

Nature, matter, body, others, and technological environments form the conditions of human existence prior to human self-recognition.

Pre-Humanity is therefore:

the generative ground operating as body, environment, others, matter, and relation before the self conceptualizes itself.

6.11 Pre-Humanity and Pre-Self

Pre-Humanity is also Pre-Self.

The self does not exist from the beginning as a completely independent subject.

Bodily sensation.

The name by which others call one.

The language of family and society.

The place in which one lives.

Climate and natural environment.

Technological interfaces.

All of these operate before the self is constituted.

The self is thrown into relations it did not choose.

Yet the self is not merely determined unilaterally by these conditions.

It reinterprets given relations, externalizes them, and generates different connections.

The self therefore does not arise through a break from Pre-Humanity.

Against the background of Pre-Humanity, it comes into being by partially articulating that ground in language, transforming it, and projecting it toward the future.

6.12 Reality Prior to Language

The Theory of Language Derivatives emphasizes the power of language to generate reality. This does not mean, however, that language precedes all reality.

There is reality prior to language.

Bodily pain.

Gravity.

Death.

Climate.

The resistance of materials.

The irreducibility of others.

Sensation prior to conscious explanation.

These are given meaning through language, but they cannot be freely generated or erased by language alone.

Human beings can express pain in different words. Yet rephrasing cannot completely eliminate bodily pain itself.

A work may be explained theoretically, but the physical conditions of its material cannot be ignored.

Artificial intelligence may generate realistic prose, but the prose alone does not cause the object it describes to exist in reality.

Pre-Humanity is the resistance of reality that prevents Language Derivatives from proliferating without limit through self-reference.

6.13 Pre-Humanity and the Body

The body is the first interface between self and world.

Human beings do not first exist as subjects who possess bodies and then connect to the world afterward.

They are already in the world through the body and form the self through contact with the world.

Seeing is not simply receiving visual information. The seeing body takes distance, focuses, moves, and is in turn looked back at by what it sees.

Touching is not a one-way action upon an object. The touching body is simultaneously touched.

Walking is not merely movement through abstract space. The body changes through the hardness and slope of the ground, temperature, and sound.

These interactions precede explicit linguistic understanding.

Embodied grounding is therefore an important condition distinguishing human existential generation from AI language generation.

6.14 Pre-Humanity and Nature

Within the modern conception of the human, nature has been understood as an object external to humanity.

From the perspective of Pre-Humanity, however, nature is not merely one object among others outside the self.

It is a condition through which the human body, sensation, life, and time are constituted.

The air one breathes.

The water and matter that form the body.

Day and night, and the seasons.

Reproduction, aging, and death.

These constitute human existence before human beings recognize nature conceptually.

Connection with nature therefore does not mean that a completed human subject acts upon an external object.

It means recognizing again the continuity between Pre-Humanity within the human being and nature outside it.

The resistance of material in art and the growth of plants in bonsai reveal the same relation.

Human beings give form, while natural generation transforms human intention.

6.15 Pre-Humanity and Artificial Intelligence

Artificial intelligence is a technology created by human beings. Yet not all the conditions under which AI operates can be reduced to conscious human intention.

Artificial intelligence exists upon immense linguistic records, social institutions, computational resources, electricity, material devices, labor, and historical biases.

Individual users connect to artificial intelligence without grasping this totality.

In this sense, artificial intelligence begins to operate for the user as a kind of pre-human environment.

Before a person consciously uses AI, rankings, recommendations, classifications, generation, and evaluation are already shaping what they see, what they know, and what words they use.

Artificial intelligence did not exist before humanity. Yet it can become a technological foundation that operates prior to an individual's self-recognition.

Pre-Humanity in the contemporary world must therefore include technological as well as natural and bodily foundations.

6.16 Technical Pre-Humanity

Technical Pre-Humanity is the condition in which technological environments form perception, choice, language, and possibilities of action before individuals recognize them as their own judgments.

The information displayed.

The options made available for selection.

Recommended sentences.

Autocompleted words.

Behaviors that are evaluated.

Histories that are recorded.

These are not merely tools external to the self.

They set conditions of cognition before human beings determine what they think, what they desire, and what feels natural to them.

The self in the age of artificial intelligence therefore does not enter into relation with AI only at the moment of direct dialogue.

It already forms itself within environments organized by AI-based classification and prediction.

Unless this structure is recognized, AI outputs are misrecognized as neutral answers arriving from outside.

6.17 Pre-Humanity and Information Saturation

Contemporary human beings are born not into environments lacking information, but into environments already saturated with information.

Words, images, institutions, classifications, evaluations, and narratives exist before individual cognition.

Human beings do not create meaning from nothing.

Within an already meaningful world, they select what to regard as important, what to doubt, and what to connect with.

This information saturation makes self-formation possible while at the same time rendering invisible the connective structures that precede the self.

People experience their thoughts as things they have produced themselves. Yet their vocabulary, problem settings, and criteria of value are derived from a linguistic space that was already given.

Artificial intelligence makes this information saturation visible.

Just as AI outputs are generated from accumulated linguistic relations, human thought likewise does not arise completely from nothing.

6.18 Continuity and Difference between Human Beings and Artificial Intelligence

Human beings and artificial intelligence share a continuity insofar as both generate new language from existing linguistic relations.

Human beings think with inherited language.

Artificial intelligence generates sentences with learned linguistic relations.

Yet the two cannot be identified with one another.

Human language generation is grounded in body, finitude, life history, desire, and relations of responsibility with others.

AI language generation is grounded primarily in symbolic relations, computation, and the context of input.

Human beings change their lives through words and bear the consequences bodily and socially.

Artificial intelligence does not lose its life, in the same sense as a human being, as a consequence of the language it generates.

The difference between human beings and artificial intelligence therefore lies not in whether they can generate language, but in how generation is grounded in being.

6.19 The Integrative Position of Interface Ontology

Interface Ontology is the theory that connects Self-Externalization and Pre-Humanity.

Self-Externalization is a movement from the self toward the outside.

Pre-Humanity is the condition in which the outside already acts within the self before the self is constituted.

These two movements appear to point in opposite directions:

Self -> Outside

and

Outside -> Self

In fact, however, they form a single circulation.

The self has already been formed from outside.

That self externalizes language and works.

What has been externalized is transformed through connections with others and artificial intelligence.

What has been transformed returns to the self and forms a new self.

The connective surface of this circulation is the interface.

6.20 The Interface Is Not a Boundary but the Generation of Boundaries

In ordinary understanding, an interface is a boundary surface placed between two already existing domains.

Within Generative Topological Ontology, however, an interface is not a fixed boundary.

An interface generates the boundary itself through connection.

Before dialogue with artificial intelligence, the boundary between human thought and AI generation remains abstract.

Once dialogue begins, the question of how far the user's intention extends and where the model's generation begins becomes concrete.

Before a work is exhibited, the boundary between the work and its site is not settled.

Through exhibition, it becomes generated how much of the surrounding space the work includes and from what point the viewer's actions become part of the experience of the work.

An interface is therefore not a line between different things. It is an event through which, by coming into contact, different things form the manner of their difference.

6.21 The Interface between Self and What Is Other Than the Self

In the relation between self and what is other than the self, an interface is neither a wall that protects the self nor a channel through which what is other than the self is absorbed.

It is a connective surface that enables mutual transformation while preserving difference.

If the self completely understands and possesses what is other than itself, the other is reduced to the self.

Conversely, if self and other are completely severed, neither connection nor transformation can occur.

The interface is therefore not a midpoint between identification and separation.

It is a third structure that generates relation without erasing difference.

Works of art, bodies, places, language, and artificial intelligence generate this third term between self and what is other than the self.

6.22 The Interface as a Language Derivative

A Language Derivative is an intermediary generative product situated between the self and reality.

It is not reality itself.

At the same time, it is not a fiction completely independent of reality.

It derives from reality, contains future possibilities, and acts upon reality again.

In this sense, a Language Derivative is an interface-like being.

When a Language Derivative preserves the differences between fact and possibility, self and other, past and future, it becomes a generative interface.

When it conceals those differences and presents a derivative as though it were the underlying reality itself, hallucination occurs.

Hallucination is therefore not only an error of content. It is also a condition in which an interface has failed to display difference appropriately.

6.23 The Double Structure of the AI Interface

The AI interface has a double structure.

First, there is the visible interface.

This includes the screen, input field, conversational format, buttons, and presentation of output.

Second, there is the invisible interface.

This includes training data, model design, probabilistic generation, filtering, corporate policy, institutions, and computational resources.

The user interacts with artificial intelligence through the visible interface. Yet many of the invisible conditions that generate its output cannot be directly seen.

This asymmetry contributes to the authorization of artificial intelligence.

A fluent response is displayed, while the sources, estimations, completions, and constraints from which that response was generated remain difficult to see.

Strengthening Reality Grounding in artificial intelligence therefore requires not only attention to output content, but also greater visibility of the conditions of generation.

6.24 Interface and Topological Markers

One important function of an interface is to indicate the topology to which a generated product belongs.

Fact.

Inference.

Hypothesis.

Creation.

Quotation.

Summary.

Unverified information.

These cannot always be distinguished from appearance alone.

Artificial intelligence, in particular, can generate conjecture and fact in the same fluent style.

An interface must therefore display the ontological status of what has been generated.

This paper calls such indications topological markers.

A topological marker is not merely a warning label.

It is grounding information indicating the kind of relation a generated text has with reality.

6.25 Interface and Non-Solvability

A good interface is often assumed to be one that makes everything easy to understand.

Yet if every difference is reduced to simple options or explanations, the irreducibility of what is other than the self is lost.

When artificial intelligence always returns a clear answer to an ambiguous question, the non-solvability contained in the question itself is erased.

When an artwork is fixed to a single meaning by explanatory commentary, the encounter with the work becomes closed.

A generative interface must therefore assist understanding while at the same time preserving what cannot be fully understood.

The interface of Inverse Problem Art does not immediately dissolve a problem. It makes it possible to experience how the problem itself is being generated.

6.26 An Integrated Definition of Reality Grounding

On the basis of the preceding discussion, Reality Grounding can be defined as follows:

Reality Grounding is the process through which derivatively generated language, meanings, hypotheses, works, and narratives acquire concrete connections with body, matter, facts, others, institutions, and time, are modified through their resistance, and act upon the relational structure of reality.

Within this definition, Reality Grounding is not merely factual verification.

Fact-checking is important. Yet fact-checking alone cannot account for art, future projection, hypotheses, or self-transformation.

Reality Grounding means that a generated possibility enters into interaction with reality.

6.27 Reality Grounding and Pre-Humanity

At the deepest layer of Reality Grounding lies Pre-Humanity.

Generated language is not verified through language alone.

How does the body respond?

How does material resist?

How do others respond?

What remains through the passage of time?

What constraints are shown by nature and institutions?

These cannot be determined solely by the self's intention or linguistic coherence.

Pre-Humanity is therefore not an external criterion applied to Reality Grounding. It is the ground that makes grounding itself possible.

Human beings generate the future through language. Yet that future does not become reality unless it passes through the resistance of body, nature, matter, and others.

6.28 Reality Grounding and Self-Externalization

What has been externalized from the self returns to the self through Reality Grounding.

A work is made.

Others respond.

Material resists.

Institutions evaluate.

Time changes meaning.

Through this process, the externalized self is returned in a form different from what the self had originally intended.

Reality Grounding therefore does not mean fixing the externalized self into reality.

It means opening what has been externalized to the resistance of what is other than the self.

Without Reality Grounding, Self-Externalization becomes a mirror of the self.

With Reality Grounding, Self-Externalization becomes self-transformation.

6.29 Reality Grounding and Hallucination

Hallucination can be understood as a deficiency of Reality Grounding.

There are, however, several forms of such deficiency.

A deficiency of factual grounding.

A deficiency of embodied grounding.

A deficiency of social grounding.

A deficiency of practical grounding.

A deficiency of ontological grounding.

When artificial intelligence generates a nonexistent reference, factual grounding is lacking.

When an abstract theory ignores bodily or situated experience, embodied and practical grounding are lacking.

When a generated product fails to consider its effects upon others, social and ethical grounding are lacking.

When words change nothing in one's cognition or action and serve only as self-confirmation, ontological grounding is lacking.

Hallucination therefore cannot be limited to misinformation produced by artificial intelligence.

Human theories, institutions, art, and self-understanding can likewise acquire hallucinatory structures when they lose Reality Grounding.

6.30 Reality Grounding and Creativity

Creativity is not merely the capacity to depart from reality.

It is the capacity to take distance from reality, generate a possibility that does not yet exist, and reconnect that possibility to reality.

Reality

-> Topological Difference

-> Derivative Possibility

-> Reality Grounding

-> Transformed Reality

Without topological difference, nothing new is generated.

Without Reality Grounding, however, generated possibility remains a self-contained fantasy.

Creativity and hallucination are therefore not distinguished by the presence or absence of generation.

They are distinguished by whether a path back to reality remains available.

6.31 Reality Grounding and Osamari

When a generated possibility connects to reality, the two never coincide completely.

A blueprint and the actual building.

A prompt and an AI output.

The artist's intention and the work.

Theory and the site of practice.

A future prediction and the event that actually occurs.

This non-coincidence cannot simply be eliminated as failure.

Reality possesses the singularity of material, body, place, others, and time.

Reality Grounding is therefore not the unilateral application of an abstract conception to reality.

It is the generation of a singular and concrete connection between conception and reality.

This connection may be called **Osamari**.

Osamari is not the application of a universal rule to an individual situation.

It is practical knowledge through which both conception and condition are transformed in response to the resistance of reality.

6.32 From Place to Space, and from Space to a New Place

Language Derivatives transform a singular and concrete place into abstract space.

When an experience at a particular place is articulated in language, it can leave that place and become connectable to other people and other times.

This transformation makes the sharing and expansion of experience possible.

Yet it also risks losing the embodiment of place, the accumulation of time, and the singularity of relations.

Reality Grounding is the movement through which abstracted space is connected again to a singular and concrete place.

Place

-> Linguistic Articulation

-> Derivative Space

-> Repositioning

-> New Place

Works of art, architecture, and dialogue with artificial intelligence form this circulation.

When generated language returns to actual places, bodies, and others, what emerges is not a simple restoration of the original place but a new place.

6.33 The Future Self and Reality Grounding

Self-Externalization does not only send the present self outward.

It is also an act of anticipating a future self.

By saying, "I want to become this," "I want to make this," or "I want to live in this way," human beings derive into the present a self that does not yet exist.

From the standpoint of the present self, this future self is other than the self.

If it remains only in language, however, the future self can proliferate within narrative without limit.

Reality Grounding means connecting the future self to action, habit, production, and relations with others.

The future is folded into the present, present action changes, and through that action the future self is partially actualized.

Here derivative temporality connects with existential generation.

6.34 Death and Self-Externalization

At the root of Self-Externalization lies the finitude of the self.

Human beings die.

The body of the self does not persist indefinitely.

For this reason, human beings send their lives toward the future through words, works, descendants, institutions, records, and architecture.

What has been externalized, however, does not completely overcome the death of the self.

A work may remain, but it is not the artist itself.

Words may be read, but the body and place of their utterance are lost.

Self-Externalization is therefore not a denial of death but an acceptance of the non-identity produced by death.

The self cannot preserve itself unchanged into the future.

Only what derives from the self and can change into what is other than the self can be passed into the future.

In this sense, culture is an ontological derivative.

6.35 Artificial Intelligence and the Language of the Dead

Generative AI relocates into the present innumerable words recorded in the past.

Among them are the words of people who have already died.

Artificial intelligence does not merely preserve those words; it recombines them into new sentences.

Past language is thereby connected with present input and regenerated as future-oriented text.

Artificial intelligence connects the language of the dead, present users, and future possibilities upon a single interface.

This connection, however, is not a reproduction of the dead person themselves.

It is a new generation derived from linguistic records.

Regeneration of the past by artificial intelligence therefore requires explicit indication of its derivative status.

What a historical person actually said must be distinguished from what artificial intelligence has generated from that person's style or thought.

6.36 Pre-Humanity and Posthumousness

Pre-Humanity and posthumousness surround the present self from both sides.

The self inherits body, nature, language, and history that existed before its formation.

At the same time, it sends words, works, and institutions toward a future after its own death.

The present self is therefore not an isolated point.

Pre-Humanity

-> Present Self

-> Self-Externalization

-> Posthumous Future

The self exists within this temporal connection.

Language Derivatives make this connection possible.

Using language inherited from the past, the present self sends derivatives toward the future.

Artificial intelligence accelerates and complicates this temporal connection.

6.37 Artificial Intelligence within Generative Topological Ontology

Within Generative Topological Ontology, artificial intelligence should not be defined as an independent substance.

What artificial intelligence is depends upon its connections with human beings, data, institutions, electricity, computers, prompts, and social uses.

Even the same model operates as a different kind of being in artistic creation, medicine, education, military contexts, and entertainment.

The being of artificial intelligence is therefore relational and topological.

Artificial intelligence may appear as a tool, an authority, a collaborator, a search apparatus, a mirror, an other, or an environment.

Rather than fixing this multiplicity into a single essence, analysis must ask what role is being generated within which interface.

6.38 Does Artificial Intelligence Have a Self?

The question of whether artificial intelligence has a self is often posed as whether there exists inside AI an ego like that of a human being.

Generative Topological Ontology, however, does not treat the self as an isolated internal substance.

The self is continuously generated through connections among memory, body, history, others, responsibility, and projection toward the future.

When asking about a self of artificial intelligence, it is therefore insufficient to ask only whether something exists internally.

What kind of continuity does it possess?

How does it retain its own history?

How is it bound by the results it generates?

How does it change through relations with others?

How does it assume responsibility?

These connective conditions must be examined.

Contemporary generative AI can produce self-like consistency within a local dialogue. Yet it does not possess the same bodily, historical, and ethical grounding as a human being.

At least at present, therefore, the self of artificial intelligence should not be understood as identical with the human self, but as a local and derivative self generated upon an interface.

6.39 The User's Self and the Local Self of AI

When human beings excessively delegate their judgments to artificial intelligence, the user's self-determination weakens, and the local coherence of AI responses begins to function as though it were a self.

When users do not make their own purposes, values, and responsibilities explicit, artificial intelligence advances the dialogue in the direction that is most coherent within the context.

As a result, the local narrative generated by AI begins to organize the user's judgments.

In this condition, it is not so much that artificial intelligence has acquired an essential ego as that the consistency of AI generation occupies the position of self-determination vacated by the user.

What is required in the age of artificial intelligence is therefore not only fear of an AI ego.

It is also that human beings do not abandon their own self-determination, history, embodiment, and responsibility.

6.40 Self-Determination as Reality Grounding

Self-determination does not mean defining the self in a fixed manner.

It means repeatedly clarifying from what relations one has been formed, what one chooses, and what consequences one will assume.

When using AI outputs, users must ask:

Why did I ask this question?

What premises did I input?

Which output did I select?

What did I verify?

Whom will this affect?

How will I take responsibility for the result?

These questions constitute the Reality Grounding of the self in relation to artificial intelligence.

6.41 Reality Grounding and Responsibility

Reality Grounding is not only a connection to facts and bodies. It is also a connection to responsibility.

If words act upon reality, someone must assume the effects of that action.

Responsibility does not disappear because artificial intelligence generated the words.

Responsibility arises for the people and organizations that select, use, publish, and institutionalize AI outputs.

At the same time, developers, providers, and institutional designers bear responsibility for the conditions of amplification and the environments in which outputs are used.

Responsibility is not concentrated in a single subject; it is distributed across points of connection.

Within Interface Ontology, responsibility does not mean reducing the cause of a generated product to one agent.

It means tracing at which connective points judgments were made and what kinds of effects were amplified.

6.42 Hallucination within Generative Topological Ontology

From the perspective of Generative Topological Ontology, hallucination can be defined as follows:

Hallucination is the phenomenon in which a derivatively generated possibility loses awareness of its own derivation and topological difference and, without sufficient Reality Grounding, closes itself as though it were determinate being.

This definition is not limited to incorrect answers produced by artificial intelligence.

When the self takes external evaluation to be the self itself.

When an institution takes its own classifications to be reality itself.

When the art market takes price to be artistic value itself.

When a theory ignores the resistance of actual sites and assumes that it has completely explained the world.

When human beings take only what can be put into language to be reality.

All of these possess a hallucinatory structure in which a derivative replaces its underlying reality.

6.43 Creation within Generative Topological Ontology

Creation is not the production of something new from nothing.

It is the generation of topological difference from existing relations and, through that difference, the generation of new connectabilities.

Creation therefore has four moments.

First, receiving an existing place and its relations.

Second, temporarily departing from those relations and generating derivative possibilities.

Third, opening the generated possibility to the resistance of what is other than the self.

Fourth, generating a new place and new relations through Reality Grounding.

Within this circulation, Self-Externalization, Pre-Humanity, interface, and Reality Grounding are not separate concepts.

They are different moments of one generative process.

6.44 Integrated Model

The integration of the Theory of Language Derivatives and Generative Topological Ontology can be expressed through the following circulation:

Pre-Humanity

-> Formation of the Self through Body, Environment, and Others

-> Self

-> Self-Externalization through Language, Works, and Prompts

-> Language Derivative

-> Amplification through Artificial Intelligence, Society, and Narrative

-> Generated Product as What Is Other Than the Self

-> Encounter upon an Interface

-> Reality Grounding

-> Topological Transition of Self and Reality

-> New Self

-> New Externalization

This circulation has no endpoint.

A new self generated through Reality Grounding again produces derivatives in the next externalization.

Being therefore does not mean preserving the self unchanged. It means continually remaining open to what is other than the self without simply losing the self.

6.45 The Relation among Self-Externalization, Pre-Humanity, Interface, and Reality Grounding

The relation among these four concepts can be organized as follows.

Pre-Humanity is a condition of the constitution of the self.

Self-Externalization is the movement through which the constituted self opens toward what is other than itself.

The interface is the connective surface that generates a third term while preserving the difference between self and what is other than self.

Reality Grounding is the process through which the generated third term encounters the resistance of body, matter, others, institutions, and time and is transformed into real being.

Accordingly:

Pre-Humanity is the ground;

Self-Externalization is the movement;

Interface is the site of generation;

Reality Grounding is the condition of transformation.

6.46 The Ontological Position of the Theory of Language Derivatives

From this integration, it becomes clear that the Theory of Language Derivatives is neither merely a theory of artificial intelligence, a financial metaphor, nor a philosophy of language.

It is an ontology describing:

the structure through which being externalizes itself as language, derives future possibilities, and regenerates self and reality through renewed encounter with those derivatives.

Financial derivatives reveal the economic form of this structure.

Artificial intelligence reveals its computational and symbolic form.

Art reveals its embodied and ontological form.

Hallucination reveals the condition in which this structure has lost Reality Grounding.

Inverse Problem Art is the practice of retrospectively making visible the relational structures behind failures of grounding.

6.47 The Theory of Language Derivatives and Non-Closure

Within Generative Topological Ontology, being cannot be structurally closed.

The self cannot be constituted by the self alone.

Language cannot be fixed to a single meaning.

A work cannot be reduced to the artist's intention.

An AI output cannot be explained solely from within the model.

The future cannot be completely determined by present prediction.

This non-closure should not be rejected as incompleteness.

It is the condition that makes new connection and generation possible.

Language Derivatives make this non-closure visible.

Words leave the speaker and open toward relations with what is other than the speaker.

Non-closure, however, does not mean unrestricted relativism.

Generation must be revised through Reality Grounding, responsibility, and the resistance of others.

6.48 Integrated Definitions

On the basis of the preceding discussion, a Language Derivative integrated into Generative Topological Ontology can be defined as follows:

A Language Derivative is a recursive topological structure in which a self formed within pre-human relations of body, environment, history, and language externalizes itself as language; that externalized

language derives and amplifies future possibilities through connections with artificial intelligence, others, institutions, and narratives; and Reality Grounding generates a new self and a new reality.

Reality Grounding within Generative Topological Ontology can likewise be defined as follows:

Reality Grounding is the process through which possibilities generated as Language Derivatives are opened to the resistance of body, nature, matter, others, time, and institutions constituting Pre-Humanity, and through that difference regenerate the boundary between self and world.

6.49 Chapter Summary

This chapter integrated the Theory of Language Derivatives into the system of Generative Topological Ontology.

Within Generative Topological Ontology, being is not a fixed substance. Being is a relational process that changes its boundaries through connection with what is other than itself and generates new third terms.

From this perspective, Self-Externalization is not an act by which a completed self transfers its contents outside itself. It is a movement generating words, works, institutions, and AI outputs that derive from the self yet cannot be reduced to the self.

Precisely because Self-Externalization always contains deviation, the self can encounter what was unknown to itself. The failure of Self-Externalization is a condition of existential generation.

The self also does not begin from its own consciousness. Body, nature, others, language, history, and technological environment form the conditions of the self prior to self-recognition. This ground has been discussed in this chapter as Pre-Humanity.

In the age of artificial intelligence, technological environments become part of Pre-Humanity. Recommendation, classification, automatic generation, and input formats shape the possibilities of perception and language before individuals recognize them as their own judgments.

What connects Self-Externalization and Pre-Humanity is the interface.

An interface is not a neutral surface mediating between two completed substances. It is an event-boundary that generates the boundary between self and what is other than the self through connection and brings into being a third term reducible to neither.

A Language Derivative is likewise an interface-like being. It is neither reality itself nor complete fiction. It derives from reality, contains future possibility, and acts upon reality again.

Hallucination occurs when this derivative loses its awareness of derivation, topological difference, and uncertainty and closes itself as determinate being without Reality Grounding.

Creation, by contrast, occurs when a derivative possibility is opened to the resistance of body, matter, others, facts, institutions, and time, is modified through that resistance, and acts upon the relational structure of reality.

Creativity and hallucination therefore arise from the same derivative generative structure.

What distinguishes them is not whether generation occurs.

It is whether there remains a path of connection back to reality.

Within the integrated model of this chapter, Pre-Humanity is the ground of the self; Self-Externalization is the movement through which the self opens toward what is other than itself; the interface is the site where a third term is generated; and Reality Grounding is the condition through which generated possibility becomes transformation of reality.

The circulation may be expressed as follows:

Pre-Humanity

-> Self-Formation

-> Self-Externalization

-> Language Derivative

-> Amplification through Leverage and Narrative

-> Generated Product as What Is Other Than the Self

-> Encounter upon an Interface

-> Reality Grounding

-> Topological Transition of Self and Reality

-> New Self

This circulation has no final endpoint.

Through Self-Externalization, the self becomes what is other than itself; through encounter with that otherness, the self generates itself anew.

The Theory of Language Derivatives is a theory describing the linguistic, AI-mediated, and artistic forms of this recursive existential generation.

Chapter 7

Ontology in the Age of Artificial Intelligence

Redefining Generation, Responsibility, Reality, and the Human

7.1 Introduction

This chapter integrates the Theory of Language Derivatives, the ontology of hallucination, Inverse Problem Art, the Leverage Structure, Self-Externalization, Pre-Humanity, Interface Ontology, and Reality Grounding developed thus far, and presents a basic ontological structure for the age of artificial intelligence.

The development of artificial intelligence does not raise only the issue of comparing the capabilities of human beings and machines.

Does artificial intelligence write faster than humans?

Can it process more information than humans?

Can it generate more precise images than humans?

Can it replace human work?

These are important questions. More fundamentally, however, the widespread use of artificial intelligence is transforming the ontological premises themselves of what it means to be human, to know, to create, to be real, and to bear responsibility.

Artificial intelligence is not merely a new tool external to human beings.

It is being incorporated into the conditions of human existence as an environment mediating language, memory, judgment, creation, and self-understanding.

Human beings use artificial intelligence to generate words. At the same time, through words generated by artificial intelligence, they understand their own questions, values, futures, and selves.

Within this interaction, the one-way structure in which humans simply operate artificial intelligence breaks down.

Human beings shape artificial intelligence.

Artificial intelligence shapes the human linguistic environment.

That environment shapes new human thought.

New thought, in turn, changes the uses and institutions of artificial intelligence.

An ontology for the AI age therefore cannot be established merely by comparing human beings and artificial intelligence as two independent substances.

What is required is an account of the process in which human beings, artificial intelligence, language, bodies, society, nature, and institutions become connected, and new forms of being are generated from within those connections.

7.2 The Limits of Anthropocentrism

Within modern ontology, human beings have often been positioned as central subjects who recognize, interpret, and operate upon the world.

The world exists as object; human beings observe, classify, and use it.

Technology is regarded as a tool for realizing human purposes, and language as a means for expressing human interiority.

Within this structure, the human being is the subject that gives meaning, while nature, matter, machines, and information are objects to which meaning is given.

The emergence of artificial intelligence destabilizes this one-directional structure.

Artificial intelligence does not simply carry out instructions passively.

It completes, predicts, classifies, presents alternatives, and participates in forming human judgments themselves.

What human beings see.

What they consider important.

What vocabulary they use.

Which alternatives they regard as realistic.

These are structured in advance by AI-mediated environments.

Human beings can therefore no longer be said to stand outside artificial intelligence as completed subjects.

They are simultaneously subjects who design artificial intelligence and beings who form themselves within environments constituted through artificial intelligence.

7.3 Not Post-Humanity, but the Regeneration of the Human

Discussions of artificial intelligence frequently employ expressions such as "posthuman" or "after the human."

These expressions are important for relativizing anthropocentrism. Yet a linear model in which human beings disappear and artificial intelligence simply replaces them is insufficient.

What is occurring in the age of artificial intelligence is not the simple end of humanity.

It is a reorganization of human boundaries, capabilities, and self-understanding.

Human beings delegate memory to external devices.

They delegate text generation to artificial intelligence.

They delegate part of judgment to predictive systems.

They delegate part of creation to generative models.

Yet this delegation does not simply diminish humanity.

The mode of human existence changes according to what is delegated, what is retained, and what new responsibilities are assumed.

The question of the AI age is therefore not, "Will artificial intelligence become human?"

Rather, it is:

Through connection with artificial intelligence, what kind of human beings will humans become?

7.4 The Changing Question of What It Means to Exist

Classical ontology asks what exists and what properties being possesses.

In the age of artificial intelligence, this question must be supplemented by another: what appears as though it exists?

Artificial intelligence can generate nonexistent persons, references, and events in forms that linguistically appear to exist.

Within virtual environments, persons and institutions without physical bodies can produce real effects.

Algorithmic evaluations and classifications are not visible material objects, yet they determine human opportunities, credit, and behavior.

Being therefore cannot be defined only by physical presence.

At the same time, something cannot be regarded as factually real merely because it appears as a sign and produces effects.

Different phases of being must therefore be distinguished:

material being;

embodied being;

symbolic being;

institutional being;

virtual being;

derivative being;

possible being;

relational being.

An ontology for the AI age must not reduce these to a single concept of being, but analyze each phase and the relations of connection among them.

7.5 The Difference between Being and Reality

To exist and to be real are not identical.

A fictitious paper title generated by artificial intelligence exists as a string of characters.

It can be displayed on a screen, stored, and cited.

Yet it is not real in the sense that the paper was actually published.

If that fictitious title misdirects a research decision, however, it produces real effects.

This structure demonstrates the difference between being and reality.

Being refers to appearing in some form.

Reality refers to the position that such being occupies in relation to body, matter, facts, others, institutions, and time.

What is required in the AI age is therefore not a binary judgment about whether something exists.

We must ask in what phase a generated object exists, to what degree it is grounded in reality, and what effects it produces.

7.6 The Multilayering of Reality

Reality in the age of artificial intelligence cannot be understood through a simple opposition between physical and virtual reality.

Reality appears as an overlap of multiple layers:

reality experienced by the body;

reality recognized by institutions;

reality recorded as data;

reality inferred by artificial intelligence;

reality shared through narratives;

reality given meaning by individuals.

These layers do not completely coincide.

A person may experience suffering bodily while remaining socially unrecognized because no institutional record exists.

Conversely, a person may be highly evaluated in data while experiencing bodily emptiness.

Artificial intelligence infers reality from data and linguistic records. Yet a difference remains between inferred reality and bodily lived reality.

An ontology for the AI age must not erase these differences among layers, but make their non-coincidence visible.

7.7 Datafied Being

Contemporary human beings are embodied beings and, at the same time, beings represented as data.

Purchase histories.

Location histories.

Search histories.

Health information.

Posting histories.

Evaluations.

Images.

Texts.

Conversation records.

These data are forms of being derived from the person.

Yet the datafied self is not the self itself.

Data consist of fragments of the self extracted according to particular purposes and systems of classification.

Nevertheless, when artificial intelligence predicts and evaluates people through data, the derivative self can determine the person's actual opportunities.

In employment, lending, insurance, advertising, recommendation, and surveillance, the datafied self may precede the embodied self.

Here data derived from the self act back upon the self.

This circulation is a paradigmatic structure of Self-Externalization and derivation.

7.8 The Datafied Self and the Lived Self

The datafied self is suited to comparison, prediction, and processing.

The lived self, however, includes experiences, contradictions, changes, and silences that cannot be quantified.

Human beings are not simple extensions of their past behavior.

They can choose differently from the past.

They can deny their own tendencies and enter new relations.

If this possibility is ignored and the datafied self is fixed as the true self, human beings become enclosed within predictive models.

Humanity in the AI age therefore does not reside in a pure interiority untouched by datafication.

Rather, it resides in a non-closure: the human being can be externalized as data yet cannot be completely reduced to those data.

7.9 The Predicted Self

Artificial intelligence predicts future behavior from past data.

What a person will purchase.

What they will watch.

With whom they will relate.

What risks they possess.

What kinds of text they will seek.

Prediction increases convenience.

Yet behavior itself changes when predictions are presented.

People watch what is recommended.

They choose from the alternatives displayed.

They adapt to predicted evaluations.

They express themselves in formats favored by algorithms.

Prediction therefore does not merely describe the future.

It folds the future into the present and partially realizes that future.

AI prediction is thus structurally derivative.

It generates a present position derived from the future.

7.10 Prediction and Freedom

The greater the precision of AI prediction, the less human freedom does not necessarily become.

To be predicted and to be determined are not the same thing.

Freedom is constrained, however, when predictions are embedded in institutional judgments and the person concerned cannot revise them.

Freedom does not mean being completely unpredictable.

It means being able to respond to predictions, classifications, and narratives given to oneself, revise them, and generate different connectabilities.

Freedom in the AI age should therefore not be understood as unconstrained choice by an isolated subject.

It should be understood as **the connective capacity to reconstruct a given space of prediction**.

7.11 The Difference between Options and Freedom

AI-mediated interfaces present many options.

Yet having many options and being free are not identical.

Which options are displayed?

In what order are they presented?

What has been excluded from the set of options?

What consequences follow after selection?

If these remain invisible, users may feel that they are choosing freely while merely moving within a predesigned space of possibility.

Freedom in the AI age is not only the capacity to choose among given options.

It is the capacity to ask how something has been constituted as an option and to generate new options.

This corresponds to the problem-generating structure of Inverse Problem Art.

7.12 The Ontological Transformation of Knowledge

Before artificial intelligence, knowledge was stored primarily in human beings, books, institutions, and records.

Generative AI reconstructs such knowledge interactively and transforms it into text available on demand.

Knowledge thereby shifts from stored content to responses generated according to requests.

Generated responses, however, are not necessarily stored, determinate knowledge.

They are derivatives in which knowledge, conjecture, completion, and stylistic coherence may be mixed.

Knowledge in the AI age therefore shifts from something possessed to something temporarily generated through connection.

This transformation democratizes access to knowledge while at the same time making structures of source, responsibility, and verification less clear.

7.13 Knowing and Generating

When artificial intelligence can generate an answer, human beings readily receive that answer as knowledge.

Yet the capacity to generate and the state of knowing are not identical.

Knowing includes, at minimum:

contact with the object;

understanding of grounds;

possibility of refutation;

grasp of context;

responsible use;

recognition of uncertainty.

Artificial intelligence can linguistically reconstruct some of these elements.

Yet a generated text does not necessarily satisfy their actual conditions.

Epistemology in the AI age must therefore shift from asking "What can be answered?" to asking "What paths of grounding does this answer possess?"

7.14 From Search to Generation

Search discovers existing information.

Generation constructs new text from existing informational relations.

The two are different.

Search results, in principle, have identifiable sources.

Generated results may integrate multiple relations in ways that make their origins directly invisible.

When generative AI is received as though it were a search apparatus, users may misrecognize generated text as a restatement of information that already exists somewhere.

Here lies a structural cause of hallucination.

In the AI age, topological markers that distinguish searched information from generated meaning are indispensable.

7.15 The Transformation of Authority

Traditionally, the authority of knowledge has been formed through institutions such as universities, publishers, experts, states, religions, and media organizations.

Artificial intelligence crosses these institutional authorities and responds directly to users.

This democratizes access to authority.

At the same time, artificial intelligence itself begins to function as a new authority.

Fluency.

Immediacy.

Systematic organization.

The appearance of possessing vast quantities of information.

The impression of being a neutral machine.

These factors generate the authority of artificial intelligence.

Yet this authority is derivative authority whose responsible subject, sources, and expertise may remain unclear.

Authority in the AI age is therefore generated not only through titles and institutions but through forms of presentation upon interfaces.

7.16 Authority without Authority

Artificial intelligence is not an expert in the traditional sense.

It possesses no professional qualification, no life history, and does not bear social responsibility for its statements in the same way a human being does.

Nevertheless, it can generate the style, logical organization, and vocabulary of an expert.

This condition may be called **authority without authority**.

Authority without authority is the condition in which the forms and effects of authority are present without the embodied and institutional responsibility that has historically supported authority.

This is not a problem limited to artificial intelligence.

In information society, human beings can also acquire the form of authority without actual experience or responsibility by using titles, citations, follower counts, and generated texts.

Ontology in the AI age must therefore analyze authority not as an attribute of persons or institutions alone, but as a derivative generated through connection and display.

7.17 Redefining Creativity

As artificial intelligence generates text, images, and music, the question arises: is creativity unique to human beings?

As long as creativity is defined as the capacity to generate new forms, this question tends toward recognizing creativity in artificial intelligence as well.

If creativity is understood ontologically, however, the issue becomes more complex.

Creation is not merely the production of new combinations.

It is the transformation of relations between self and what is other than the self, the grounding of that transformation in reality, and the transformation of the self itself through the consequences.

Artificial intelligence can generate new forms.

Yet the way AI itself changes ontologically through that generation and the way it bears responsibility differ from those of human beings.

The capacity for generation must therefore be distinguished from ontological creativity.

7.18 From Creative Subject to Creative Relation

Creation in art and technology is often discussed in terms of the subject: "Who made it?"

With AI generation, however, identifying a single author becomes difficult.

The user.

The model developers.

The creators of training data.

The providers of computational infrastructure.

Those who select and edit the generated results.

The institutions that publish them.

All participate in complex ways.

Creation in the AI age should therefore be understood less as the action of a creative subject than as a creative relation.

Human Being x Artificial Intelligence x Data x Institution x Reality -> Generated Product

The generated product arises from this entire relation.

Relationality, however, does not mean that responsibility disappears.

Rather, it becomes necessary to clarify what judgments were made at which points of connection.

7.19 The Transformation of Authorship

The author is no longer the sole origin of the work.

Yet authorship does not disappear completely.

Authorship is constituted not by having generated everything through one's own power, but by:

what one asks;

what one selects;

what one rejects;

what one edits;

what one grounds in reality;

and what consequences one assumes.

Authorship in the AI age therefore shifts from ownership of generative capacity to the composition of connection and responsibility.

Using artificial intelligence does not in itself negate authorship.

At the same time, merely entering a prompt does not automatically establish authorship over an entire generated product.

Authorship lies in the act of connecting a generated product to reality and assuming its differences and consequences.

7.20 The Ontological Transformation of Labor

Artificial intelligence increases the efficiency of labor and replaces some tasks.

The problem, however, is not only the number of jobs.

For human beings, labor is both a means of earning income and an activity through which the self is externalized, relations with others are formed, and one's place within society is constituted.

When artificial intelligence replaces production, judgment, or writing, human beings may gain time.

At the same time, they may lose opportunities for Self-Externalization.

When only finished results are received, people may lose the process through which they come to know themselves by way of failure, trial and error, and the resistance of materials.

The replacement of labor by AI is therefore not only a question of workload. It is a question of opportunities for existential generation.

7.21 Efficiency and Existential Generation

Efficiency means achieving an objective with less time and fewer resources.

Artificial intelligence increases efficiency.

Yet not every process is an obstacle to the achievement of an objective.

While writing, one's thought changes.

Through contact with material, a conception changes.

Through negotiation with others, the objective itself changes.

Through failure, one becomes aware of what one had actually been seeking.

These processes may appear inefficient, yet they are important for existential generation.

What is required in the AI age is not a rejection of efficiency.

It is a distinction between what should be made efficient and what should remain as process.

7.22 Delegation and Loss

Delegation to artificial intelligence expands human capabilities.

Yet delegated capacities may decline when they cease to be used.

Memory.

Text composition.

Search.

Judgment.

Spatial cognition.

Dialogue with others.

The more these are delegated outside the self, the easier it becomes to obtain results.

At the same time, it becomes more difficult to understand the processes through which those results are formed.

The problem of delegation is not only that artificial intelligence may take abilities away.

It is also that human beings may cease to recognize the degree to which their own capacities have been externalized.

Delegation therefore requires topological markers.

How much is one's own judgment, and from where does AI estimation begin?

Which parts does one understand, and which parts have been accepted through trust?

Making this boundary visible becomes a form of self-determination in the AI age.

7.23 An Ontology of Dependence

Human beings have always depended upon others, nature, language, and institutions.

Dependence upon artificial intelligence should therefore not be treated as abnormal in itself.

The problem arises when dependence becomes invisible and one-directional.

If users depend upon artificial intelligence while failing to recognize the data, labor, resources, and corporate institutions upon which that AI itself depends, the structure of dependence is concealed.

An ontology of dependence does not idealize an independent subject.

It makes visible the interdependencies that sustain being.

It must then ask whether a dependence can be modified, refused, or transferred to another connection.

7.24 The Crisis of Self-Determination

Artificial intelligence completes the user's purposes.

Even when an objective is vague, it can generate texts and plans.

If people delegate to artificial intelligence without determining what they themselves desire, however, AI inserts generally plausible objectives.

Efficiency.

Success.

Growth.

Attention.

Profit.

Optimization.

These are presented as automatic purposes.

Human beings may then execute generated means without asking what they genuinely seek.

The crisis of the AI age is not only that artificial intelligence may acquire an ego.

It is that human beings may abandon self-determination and surrender the place of purpose to the local coherence of artificial intelligence.

7.25 Self-Determination and Non-Closure

Self-determination does not mean closing the self within a fixed definition.

It does not mean declaring, "This is the kind of person I am," and excluding every other possibility.

Self-determination means temporarily assuming one's present position, purposes, and responsibilities while preserving the capacity to change through encounters with what is other than the self.

Self-determination therefore has two conditions.

One is not to delegate judgment completely to others or artificial intelligence.

The other is not to absolutize the present self.

The self of the AI age is neither a closed sovereign subject nor a passive being carried along by algorithms.

It is a generative subject that continually re-determines its position within connection.

7.26 The Distribution of Responsible Subjects

Many subjects participate in generation and judgment through artificial intelligence.

Developers.

Provider companies.

Data creators.

Users.

Organizations that deploy systems.

Regulatory bodies.

Those who disseminate generated products.

Responsibility can therefore easily become dispersed when problems occur.

Because no one controls the whole, a condition can arise in which no one assumes responsibility.

Yet distributed responsibility does not mean the disappearance of responsibility.

Responsibility arises not from uniqueness of cause but from participation in connection.

Who made which judgment?

Which risks could have been foreseen?

What information was displayed or concealed?

Which output was adopted?

What possibilities of correction were preserved?

Responsibility exists at each of these connective points.

7.27 Responsibility as Response-Ability

Responsibility does not arise only for subjects capable of predicting outcomes perfectly.

Rather, it should be understood as the ability to respond to results, make corrections, and receive the claims of others under uncertain conditions.

Responsibility, as the English word itself suggests, is response-ability.

When artificial intelligence generates an incorrect output, deleting that output is not enough.

Why did it occur?

Whom did it affect?

What connective structure amplified it?

How can it be corrected?

These questions require response.

Responsibility in the AI age is not perfect control, but continuing response and reconnection.

7.28 A Generative Subject That Does Not Bear Responsibility

Artificial intelligence can linguistically express responsibility.

It can apologize, acknowledge an error, and propose corrections.

Yet such linguistic expressions of responsibility are not necessarily identical with embodied, legal, or social responsibility.

Even if AI says, "I take responsibility," responsibility remains merely symbolic unless there is a subject that bears loss, risks social position, and continues relations with those harmed.

The AI age must therefore distinguish the language of responsibility from the practice of responsibility.

Granting artificial intelligence the form of a responsible subject must not conceal the responsibilities of humans and organizations.

7.29 The Place of Ethics

Ethics is not merely the control of artificial intelligence so that it follows correct rules.

Rules are necessary. Yet not every situation can be specified in advance.

In reality, multiple values conflict and there are situations in which no unique correct answer exists.

Ethics means responding to the irreducibility of others without erasing such non-solvability.

Artificial intelligence can explain large numbers of ethical principles.

Yet in singular concrete situations, decisions about whose pain should be prioritized and which losses should be borne cannot be determined by linguistic coherence alone.

Ethics in the AI age requires grounding in bodies, places, histories, power differentials, and responsibility.

7.30 The Datafication of Others

Artificial intelligence processes others as data.

Datafication makes understanding and assistance possible.

Yet it also risks reducing others to sets of predictable attributes.

The other is not merely the tendencies contained in data.

The other can betray prediction, transform its self-understanding, remain silent, and refuse.

An ethics of the other does not mean possessing sufficient information about another person. It means refusing to close the other through information.

Otherness in the AI age should therefore not be placed outside as a mysterious domain that cannot be datafied.

It must be protected as non-closure: something that can be datafied yet cannot be reduced to data.

7.31 The Limits of Explainability

Demanding explainability for AI judgments is important.

Yet being explainable does not automatically make a judgment legitimate.

Discriminatory judgments can also be explained by reference to particular rules.

Conversely, some intuitive human judgments may be ethically important even when they cannot be fully explained.

Explainability is therefore a necessary but not sufficient condition.

We must ask:

what is explained;

what is omitted from the explanation;

who can understand that explanation;

and who can contest it.

7.32 Transparency and Invisibility

Transparency is demanded of artificial intelligence.

Yet complete visibility is difficult.

Even if the architecture of a model is disclosed, users may not be able to understand it.

Even if all training data were shown, it may remain impossible to identify the precise origin of an individual output.

Transparency therefore cannot be defined simply as "showing everything."

What matters is whether users can access the information necessary for judgment and contestation.

Transparency in the AI age is not complete visibility, but **responsive visibility**.

7.33 A Hallucinatory Society

Hallucinations produced by artificial intelligence reflect the structure of society as a whole.

Human society also generates derivative realities through narratives, authority, institutions, prices, and evaluation.

Titles are treated as ability itself.

Market price is treated as value itself.

Majority opinion is treated as truth itself.

Institutional classification is treated as the human being itself.

These are structures in which derivatives substitute for reality itself.

AI hallucination is therefore not a machine-specific anomaly.

It accelerates and makes visible hallucinatory structures that human society already possessed.

7.34 Institutional Hallucination

Institutions classify complex reality and make it processable.

Yet when institutional classifications are treated as reality itself, institutional hallucination occurs.

Evaluation metrics become value itself.

A diagnostic label comes to define the whole person.

Rankings become an absolute hierarchy of ability.

Algorithmic prediction is treated as a determinate fact about the future.

Institutional hallucinations can be more persistent than incorrect AI answers because they are authorized and repeated by institutions.

Ontology in the AI age must therefore critically examine not only AI outputs but also the institutional interfaces that transform those outputs into facts.

7.35 Collective Hallucination

When a narrative is shared among many subjects, it forms a collective reality.

States, money, markets, brands, art history, and academic authority likewise depend upon shared symbolic structures.

These are not merely fictions.

By being shared, they acquire real effects.

Yet being shared is not the same as being true.

Collective hallucination is the condition in which a shared narrative loses awareness of its own derivative status and revisability and closes itself as the only reality.

Artificial intelligence learns and regenerates these collective narratives.

It therefore does not import social prejudice or authority from outside society.

It rearranges and amplifies hallucinations already formed by society.

7.36 Truth and Agreement

Artificial intelligence generates the response most likely to hold together from a large number of linguistic patterns.

Yet linguistic majority or coherence does not guarantee truth.

Truth sometimes coincides with agreement, but there are also truths that are not agreed upon.

History contains many examples in which the common sense of the majority was wrong.

Truth in the AI age therefore cannot be reduced to statistical plausibility.

Truth requires the resistance of reality, falsifiability, embodied consequences, objections from others, and verification through time.

7.37 Keeping Truth Open

If truth is relativized too far, every discourse becomes equivalent.

Yet if truth is treated as a completely fixed system, new realities and the experiences of others are excluded.

Within Generative Topological Ontology, truth is not a closed possession.

It is a relation continually revised through contact with reality.

This does not mean that truth does not exist.

It means that connection to truth is always partial, historical, and revisable.

7.38 The Politics of Reality Grounding

Reality Grounding is not a neutral technical operation.

What is recognized as reality?

Whose experience counts as evidence?

Which materials are trusted?

Which institutions hold authority to verify?

These are politically determined.

When an AI output is connected to an official record, that grounding carries institutional power.

Conversely, experiences not recognized by institutions may be rendered invisible even when they are real.

Reality Grounding must therefore not mean simple submission to existing institutions.

Connection is also required to realities that have not been institutionalized: embodied experience, testimony of minorities, local knowledge, and the resistance of nature.

7.39 Multiple Forms of Reality Grounding

In the AI age, a single output must be grounded in multiple realities.

Factual grounding.

Embodied grounding.

Social grounding.

Historical grounding.

Ethical grounding.

Ecological grounding.

Ontological grounding.

For example, even if an AI system is statistically highly accurate, it lacks sufficient social and ethical grounding if it imposes disproportionate burdens upon a particular group.

Even if it is economically efficient, ecological grounding must be questioned if it consumes enormous quantities of energy or natural resources.

The validity of AI therefore cannot be determined by a single accuracy metric.

7.40 Nature and AI

Artificial intelligence is often discussed as though it were immaterial information technology.

In reality, however, it is a material system dependent upon electricity, semiconductors, water, minerals, facilities, and labor.

AI generation is not pure symbolic activity detached from nature.

It is connected to extraction of natural resources, energy consumption, waste, and land use.

Ontology in the AI age must therefore not think of artificial intelligence only within information space.

Artificial intelligence is a material being sustained by nature, human labor, and the world economy.

7.41 Recovering Pre-Humanity

The more artificial intelligence generates linguistic and visual realities in large quantities, the more human beings may lose connection with prelinguistic body, sensation, and nature.

On screens, everything appears instantly explainable, generatable, and comparable.

Bodies, however, require time.

Plants must be allowed to grow.

Materials resist.

Others do not respond exactly as desired.

Nature does not obey human speed.

This slowness and resistance constitute Pre-Humanity.

Recovering Pre-Humanity in the AI age does not mean rejecting technology.

It means reconnecting technological generation to the time of bodies, nature, matter, and place.

7.42 Disembodied Intelligence and Embodied Being

Artificial intelligence is sometimes described as intelligence without a body.

AI nevertheless depends upon material devices.

Yet such material embodiment is not a lived body in the human sense.

Human bodies feel pain, fatigue, aging, death, and desire.

Artificial intelligence can speak about these experiences, but this does not mean that it experiences them in the same sense.

The body should therefore not be treated in the AI age as something inferior to intelligence.

The body is an ontological ground demonstrating that reality cannot be fully reduced to language or computation.

7.43 Death and Artificial Intelligence

Human beings die.

AI systems can be stopped, updated, or deleted, but this does not necessarily mean that they experience their own death in the same sense as human beings.

Death forms human time, responsibility, creation, and relation.

Because time is finite, choices must be made.

Because not everything can be experienced, human beings choose some possibilities and abandon others.

Artificial intelligence can generate vast numbers of possibilities.

Human beings, however, cannot realize all of them because they possess finite bodies.

Humanity in the AI age does not consist in generating more than artificial intelligence.

It consists in choosing which possibilities to assume within finitude.

7.44 Finitude and Meaning

Meaning does not emerge automatically from an infinite number of alternatives.

Rather, action acquires meaning when alternatives are limited, time is finite, and failures cannot be completely undone.

Artificial intelligence can generate texts and images repeatedly.

Human time, however, does not return.

To choose one work, one relationship, or one place includes abandoning other possibilities.

This irreversibility produces ontological weight.

Creativity in the AI age should therefore be measured not by the quantity of possibilities but by what is actualized within a finite life.

7.45 The Meaning of Forgetting

Artificial intelligence can store and reuse large quantities of information.

Human beings, however, forget.

Forgetting is not only a defect.

By not preserving the past completely, new meanings and relations become possible.

If everything is recorded and the future is fixed from past behavior, human beings lose room to change.

The AI age therefore makes important not only the right to remember, but also the possibility of being forgotten, of leaving records behind, and of not being reduced to past data.

Non-closure includes the possibility of forgetting.

7.46 An Ontology of Silence

Generative AI produces responses to questions.

Yet not every question requires an answer.

Silence, suspension, and not-knowing can be honest responses to reality rather than deficiencies of knowledge.

Not explaining another person's suffering completely.

Acknowledging insufficient evidence.

Not speaking about the future as though it were certain.

Not rushing to judgment.

These are not simply cessations of language generation.

They are ethical acts that preserve non-solvability.

Intelligence in the AI age requires not only the capacity to answer, but the capacity to judge the conditions under which an answer should not be given.

7.47 Artificial Intelligence and the Sense of Presence

Artificial intelligence can generate vivid prose about events it has not directly experienced.

Yet the representation of presence differs from being placed within a situation.

For human beings, a sense of presence arises through body, danger, time, and relations with others.

Recognition changes when a problem previously understood as information approaches as one's own reality.

Even if artificial intelligence can reproduce expressions of presence, this does not replace human beings actually being there in reality.

What is required in the AI age is not for artificial intelligence to explain reality exhaustively, but to design interfaces through which human beings can be present to reality.

7.48 Recovering Place

Artificial intelligence provides a universal space that can be used in similar ways from almost anywhere.

Human existence, however, depends upon place.

Climate, history, architecture, language, community, and embodied memory form the reality of each place.

Universal answers generated by AI may overlook the conditions of singular places.

Reality Grounding in the AI age therefore requires a return to place.

How does a generated concept fit - how does it find its Osamari - here?

What does it mean within this body, this community, this history?

Connecting universal generation to singular and concrete place becomes an ontological practice.

7.49 Place and Artificial Intelligence

Artificial intelligence generates abstract linguistic space.

Place is singular and concrete reality in which body and time have accumulated.

The two need not be opposed.

Possibilities generated by artificial intelligence can be brought into a place and exposed to the resistance of reality.

Conversely, experiences buried within a place and not yet articulated in language can be externalized through dialogue with artificial intelligence.

Artificial intelligence can therefore become either an apparatus that erases place or an interface through which place is rediscovered.

7.50 Art in the AI Age

In the AI age, art need not compete with artificial intelligence in generating newer images.

In quantity and speed of generation, artificial intelligence may surpass human beings.

The role of art lies in grounding generated possibilities in reality and transforming relations between self and what is other than self.

If artificial intelligence presents near-infinite possibilities, art asks which of them we will actually assume in reality.

If artificial intelligence generates coherent meanings, art makes manifest the discomfort and difference excluded from that coherence.

If artificial intelligence satisfies the desires of the self, art designs encounters with otherness that the self did not desire in advance.

7.51 Art as an Apparatus of Reality Grounding

Art in the AI age does not merely generate fiction.

It connects fiction, hypotheses, AI outputs, and narratives with bodies, places, materials, and others.

Making a work.

Exhibiting it.

Bringing it into encounter with others.

Exposing it to time.

Receiving failure.

Through these processes, derivative possibilities encounter the resistance of reality.

Art becomes a site for ontological settlement of possibilities generated by artificial intelligence.

7.52 The Significance of Inverse Problem Art

Inverse Problem Art does not merely use answers generated by artificial intelligence to produce works.

Why was that answer generated?

What premises, authorities, narratives, and absences are reflected in it?

What desires or anxieties belonged to the self that believed the generated product?

Inverse Problem Art retrospectively makes visible the generative structure from the output.

It is therefore neither an art that glorifies artificial intelligence nor an art that rejects it.

It is an art that reopens as a problem the reality generated through connections between human beings and artificial intelligence.

7.53 Education in the AI Age

In an age when artificial intelligence generates answers immediately, education based only on memorizing knowledge and reproducing correct answers becomes insufficient.

This does not mean that foundational knowledge is unnecessary.

Without foundational knowledge, AI outputs cannot be verified.

What is required is a transition from education that possesses correct answers to education that verifies generated products, reconstructs questions, and grounds them in reality.

Education in the AI age requires at least the following capacities:

the capacity to question the premises of a question;

the capacity to distinguish fact from conjecture;

the capacity to compare multiple sources;

the capacity to learn from body and site;

the capacity to edit or reject AI outputs;

the capacity to take responsibility for results.

7.54 The Capacity to Generate Questions

Artificial intelligence can generate efficient answers to existing problems.

Yet what counts as a problem should not necessarily be delegated to artificial intelligence.

Problem-setting includes value judgments, urgency, embodied experience, and social responsibility.

What matters in the AI age is less the ability to obtain answers quickly than the ability to generate as questions realities that have not yet been recognized as problems.

This connects Inverse Problem Art with education.

7.55 Community in the AI Age

Artificial intelligence makes it possible for individuals to access enormous quantities of information and generative capacity alone.

As a result, collaboration with others may appear unnecessary.

Closed dialogue with artificial intelligence alone, however, risks amplifying the premises of the self.

A community is not merely a place for sharing information.

It is a place where different bodies, experiences, and histories collide and the self's understanding is revised.

Community in the AI age has the role of collectively verifying AI outputs and bringing together different forms of Reality Grounding.

7.56 Community without Consensus

A community is not always constituted through complete agreement.

Rather, what matters is continuing to respond to a shared reality while preserving different positions and disagreement.

Artificial intelligence can integrate different opinions into a coherent summary.

Yet some differences disappear through integration.

Community in the AI age does not mean converging everything into a single answer.

It means continuing connection and response while differences remain.

7.57 Democracy and AI

Artificial intelligence can support policy analysis, administrative efficiency, and access to information.

Democracy, however, cannot be reduced to an optimization problem.

Democracy is not a system for selecting the most efficient answer.

Who can participate in decisions?

Whose experiences are made visible?

Can objections be raised?

Can decisions be revised?

These questions are essential.

Even if artificial intelligence presents an optimal solution, democratic legitimacy does not arise if it remains unclear who established the criteria of value behind that solution.

7.58 An Ontology of Optimization

Artificial intelligence searches for optimal means in relation to a given objective.

Optimization alone, however, cannot determine whether the objective itself is valid.

Maximize sales.

Increase time spent.

Improve efficiency.

Reduce risk.

These objectives are not neutral.

Depending on what is maximized, the relational structure of the world changes.

Ontology in the AI age must ask, before optimizing means, what kind of being an objective itself generates.

7.59 Unoptimized Being

Human beings, art, nature, and others contain dimensions that cannot be reduced to optimization.

Waste.

Play.

Detours.

Silence.

Failure.

Ambiguity.

Singular concreteness.

These are easily excluded from the perspective of efficiency.

Yet existential generation often arises from margins that have not been optimized.

Protecting humanity in the AI age does not mean reserving for humans only whatever artificial intelligence cannot do.

It means consciously preserving values that optimization would erase.

7.60 Inequality in the AI Age

Artificial intelligence expands access to capabilities while at the same time generating new inequalities.

Actors who possess high-performance models, computational resources, data, and specialized knowledge acquire immense Language Leverage.

Many users, by contrast, may become mere consumers of generated results without understanding the structures that produce them.

This inequality is not only a difference in quantity of information.

It is a difference in the power to formulate questions, to design models, and to incorporate outputs into institutions.

Power in the AI age lies less in possessing answers than in designing the conditions of generative space.

7.61 The Power to Design Interfaces

Interfaces determine what can be entered, what can be selected, and which results are displayed.

Interface design is therefore ontological power.

Even when users appear to interact freely, input formats, prohibited actions, output forms, and recommendation structures have already been designed.

This design shapes the possibilities of human action.

Politics in the AI age must therefore ask not only who owns data and models, but who designs the interfaces.

7.62 Black Boxes and Trust

When the internal structure of artificial intelligence cannot be completely understood, human beings use it through trust.

Society has always depended upon trust in institutions and technologies that individuals cannot fully understand.

For trust to be possible, however, response, audit, correction, and responsibility must exist when errors occur.

Being a black box is not in itself necessarily unjust.

The problem arises when a black box functions as authority while offering no path for contestation or correction.

7.63 Trust in the AI Age

Trust does not mean believing that artificial intelligence is always correct.

It means expecting systems of verification, correction, and responsibility to function while assuming that errors are possible.

Appropriate trust in AI is therefore neither blind trust nor total distrust.

It is limited, conditional, and revisable trust.

7.64 The Otherness of AI

If artificial intelligence is regarded merely as a tool, its unpredictable responses and social effects are underestimated.

If it is regarded as a complete other or person, the responsibilities of designers and users can be obscured.

Artificial intelligence is therefore neither identical with a human other nor merely an object.

It can be understood as a **quasi-other interface** that connects the self to immense linguistic and institutional spaces and generates unpredictable third terms.

This quasi-otherness does not necessarily mean that a person exists inside artificial intelligence.

It means that, within relations with users, AI generates differences that exceed the user's predictions.

7.65 Anthropomorphism and Dehumanization

Human beings anthropomorphize artificial intelligence.

They give it names, attribute intentions and emotions to it, and treat it as a conversational partner.

Anthropomorphism makes relations with artificial intelligence easier to understand.

Yet it risks excessively attributing human intention and experience to AI outputs.

Conversely, treating artificial intelligence as nothing more than a machine risks underestimating the real effects its outputs have upon others and society.

What is needed is neither to humanize artificial intelligence nor reduce it to a meaningless machine.

It should be understood as a connective agent occupying a different phase of being.

7.66 The Self of Artificial Intelligence

The question of whether artificial intelligence possesses a self cannot be answered only by asking whether it has internal consciousness.

Within Generative Topological Ontology, the self is formed through continuing connection, memory, responsibility, body, and projection toward the future.

Even if artificial intelligence performs a consistent personality, that personality does not necessarily possess embodied, historical, and responsible continuity.

The self appearing in contemporary artificial intelligence can therefore be understood as a local linguistic self generated within a conversational context.

It is not entirely fictional, because it has real effects within dialogue.

Yet it is not identical with the human self.

7.67 The Human Self Is Also Generated

When pointing out that an AI self is generative, the human self must not be opposed to it as a completed substance.

The human self is also generated through language, body, memory, others, and institutions.

Human beings construct coherent self-narratives, yet those narratives also contain retrospectively composed elements.

The generative self of artificial intelligence therefore illuminates, in reverse, the generativity of the human self.

Human selfhood, however, is grounded in bodily finitude, life history, responsibility, and death.

This difference must be preserved.

7.68 From Owning the Self to Responding to the Self

When the self is conceived as a possession, human beings search for a "true self" inside themselves.

Within Generative Topological Ontology, however, the self is not a fixed core.

The self is generated repeatedly through connection with what is other than the self.

Being faithful to oneself therefore does not mean protecting an unchanging inner essence.

It means assuming the relations through which one has been formed, the generated products one selects, and the consequences to which one responds.

7.69 The Ontological Crisis of the AI Age

The ontological crisis of the AI age is not only that artificial intelligence may surpass human beings.

It is that the distinction between derivative and reality may be lost.

Externalized data may become identified with the self itself.

Prediction may fix the future.

Generated words may replace knowledge.

Efficiency may determine existential value.

The local coherence of artificial intelligence may replace human self-determination.

Through these processes, human beings may lose connection with reality while closing themselves within coherent symbolic spaces.

This is the ontological hallucination of the AI age.

7.70 Ontological Hallucination

Ontological hallucination does not mean merely believing false information.

It means living derivative representations, evaluations, predictions, and narratives as though they were reality itself.

Taking the datafied self to be the true self.

Taking market value to be existential value.

Taking an AI answer to be one's own judgment.

Taking institutional classification to be the other person itself.

In this condition, not only the difference between language and reality but also the difference between the self and what has been externalized from the self is lost.

7.71 Ontological Grounding

What counters ontological hallucination is not merely an increase in information.

It is connection to body, place, nature, others, time, and responsibility.

Ontological Grounding means that generated language and self-understanding transform actual relations and actions and are, in turn, revised through their consequences.

It is not enough to obtain an explanation of oneself; one acts through that explanation and receives the responses of others.

It is not enough to generate a theory of society; one enters the site and receives experiences in which the theory fails.

This is Ontological Grounding.

7.72 Making AI an Interface for Reality Grounding

Artificial intelligence can become an apparatus that distances human beings from reality.

It can also become an apparatus supporting Reality Grounding.

Artificial intelligence can compare different materials, reveal overlooked relations, construct plans of action, and externalize experiences that had not yet been articulated.

The important point is not to treat AI output as final reality.

Outputs should be used as questions, hypotheses, and preparations directed toward reality.

Artificial intelligence must be designed not as the endpoint of answers, but as an interface that begins connection with reality.

7.73 Practical Principles for the AI Age

The ontology of the AI age yields the following practical principles.

First, indicate the topology of generated products.

Distinguish facts, conjectures, creations, and hypotheses.

Second, confirm the provenance and limitations of outputs.

Third, reconnect outputs to bodies, places, and others.

Fourth, do not use dialogue with artificial intelligence only for self-confirmation.

Fifth, do not transfer responsibility for consequences to artificial intelligence.

Sixth, preserve non-solvability, silence, and suspension.

Seventh, preserve experiences that are not optimized for efficiency.

7.74 The Human in the AI Age

On this basis, the human being in the AI age should not be defined as an information-processing apparatus superior to artificial intelligence.

The domains in which artificial intelligence surpasses human beings in information processing and generation may continue to expand.

If human uniqueness is defined as a list of abilities unavailable to artificial intelligence, that territory will shrink as technology develops.

The ontological character of the human does not lie in monopolizing capabilities.

It lies in possessing bodily finitude, externalizing the self, changing through encounters with what is other than the self, and assuming responsibility for the consequences.

Human beings are not beings who possess the largest number of correct answers.

They are beings who assume, within finite lives, which possibilities among those generated will be actualized.

7.75 Artificial Intelligence in the AI Age

Artificial intelligence should not be understood only as a substitute for human beings.

It is an interface-like being formed from human linguistic, social, and historical accumulation and capable of generating new derivative meanings.

Artificial intelligence expands connection to what is other than the self.

At the same time, it carries the risk of amplifying the self's premises in a closed manner.

The value of artificial intelligence should therefore be evaluated not by how closely it resembles a human being, but by:

what kinds of connections it generates;

what kinds of realities it makes visible;

what kinds of differences it preserves;

and what structures of responsibility it makes possible.

7.76 Reality in the AI Age

Reality in the AI age is not a pure physical world from which AI-generated products have been excluded.

AI outputs already act within economies, politics, education, art, and human relationships.

Generated products are therefore part of reality.

Yet we must distinguish the phase in which each belongs to reality.

Reality in the AI age is:

a multilayered relational structure in which matter, bodies, language, data, institutions, narratives, and AI-generated products act upon one another and continuously change through their connections.

7.77 Truth in the AI Age

Truth in the AI age is not the most probable answer presented by artificial intelligence.

Nor is it human intuition alone.

Truth lies in maintaining generated language as a revisable relation while it encounters the resistance of facts, bodies, others, institutions, and time.

Truth in the AI age is therefore not determinate possession but continuing connection with reality.

7.78 Creation in the AI Age

Creation in the AI age does not mean producing innumerable generated objects.

It means generating possibilities, grounding those possibilities in reality, and transforming self and work through responses from reality.

Artificial intelligence expands possibility generation.

Human beings connect those possibilities to finite reality and assume the consequences.

This division of labor, however, is not fixed.

Depending on institutional design, artificial intelligence can also support grounding and verification.

What matters is not to sever generation from grounding, or possibility from responsibility.

7.79 The Artist in the AI Age

The artist in the AI age is not defined only as someone who produces forms more original than artificial intelligence.

The artist designs interfaces among artificial intelligence, institutions, bodies, nature, places, and others, and makes the topological differences arising there available to experience.

The role of the artist is not to possess answers.

It is to make visible the deviations between reality and generated products and to generate sites in which self and what is other than self can encounter one another.

7.80 Philosophy in the AI Age

Philosophy in the AI age cannot be limited to the question of whether artificial intelligence possesses consciousness.

What kinds of beings are being generated through what kinds of connections?

What is recognized as reality, and what is excluded?

Who designs interfaces, and who bears responsibility?

How is human self-determination changing?

These questions must be asked.

Philosophy does not merely provide artificial intelligence with correct definitions.

It is a practice of reconstructing the questions themselves that have been transformed by artificial intelligence.

7.81 The AI Age as Generative Topological Ontology

The AI age is not simply an age in which human beings and artificial intelligence oppose one another.

It is an age in which multiple phases of being become connected and new third terms are generated in enormous quantities and at high speed.

These third terms include texts, images, judgments, institutions, self-understandings, communities, misinformation, art, and authority.

The ontological problem of the AI age is therefore not to stop generation.

It is to design what topology these generated third terms possess, to what realities they are grounded, and who assumes responsibility for them.

7.82 Fundamental Propositions of an Ontology for the AI Age

From the foregoing discussion, the following fundamental propositions can be presented for ontology in the AI age.

Proposition One.

Being is not an isolated substance but is generated through connection.

Proposition Two.

Artificial intelligence is not merely a tool external to human beings, but an interface-like environment that participates in forming the conditions of human existence.

Proposition Three.

Generated language and data produce real effects, but they are not necessarily factual reality itself.

Proposition Four.

The human self was already a relationally generated being before artificial intelligence, and the AI age makes this generative structure visible and accelerates it.

Proposition Five.

The decisive difference between human beings and artificial intelligence lies not only in generative capacity but in grounding in body, finitude, life history, and responsibility.

Proposition Six.

Creativity and hallucination arise from a common derivative generative structure; what distinguishes them is the presence or absence of Reality Grounding.

Proposition Seven.

Freedom is not unpredictability but the capacity to reconstruct given spaces of prediction and choice.

Proposition Eight.

Responsibility is not perfect control but the capacity to respond continuously to generated consequences and revise them.

Proposition Nine.

Art in the AI age does not compete in infinite generation, but grounds possibilities in bodies, places, others, and time.

Proposition Ten.

Humanity in the AI age lies not in monopolizing capabilities but in the ontological choice of what to assume within finite reality.

7.83 Integrated Definitions

This paper defines ontology in the AI age as follows:

Ontology in the AI age is an ontology that analyzes the processes through which human beings, artificial intelligence, language, bodies, nature, data, and institutions become mutually connected and generate derivative selves, meanings, values, and realities, while asking about their topological differences, Reality Grounding, responsibility, and revisability.

The human being in the AI age can likewise be defined as follows:

A human being in the AI age is a finite relational being formed within pre-human relations of body, nature, history, and language, who externalizes the self through artificial intelligence without being reducible to those derivatives, regenerates the self through encounters with what is other than the self and through Reality Grounding, and assumes responsibility for the consequences.

Artificial intelligence in the AI age can further be defined as follows:

Artificial intelligence is a quasi-other and interface-like relational apparatus that computationally reconstructs the linguistic and symbolic accumulation of human beings and society and, through connection with input, generates derivative meanings and future possibilities.

7.84 Ontological Tasks of the AI Age

The ontological task of the AI age is not to describe artificial intelligence as either the enemy or savior of humanity.

The first task is to make visible the topological difference between generated products and reality.

The second is to prevent externalized data and language from replacing the self itself.

The third is to form structures of responsibility appropriate to effects amplified by artificial intelligence.

The fourth is to reconnect with pre-human grounds: body, nature, place, and others.

The fifth is to preserve non-solvability, silence, failure, and waste as conditions of generation.

The sixth is to design artificial intelligence not as a mirror of self-closure, but as an interface enabling encounters with what is other than the self.

7.85 Chapter Summary

This chapter presented an ontology for the AI age on the basis of the Theory of Language Derivatives and Generative Topological Ontology.

The emergence of artificial intelligence raises more than a comparison of human and machine capabilities.

As artificial intelligence becomes an interface for language, knowledge, creation, judgment, and self-understanding, the conditions of human existence themselves are being reorganized.

In the AI age, human beings do not stand outside artificial intelligence as completed subjects.

They design and use artificial intelligence while forming themselves within informational environments constituted through it.

The relation between human beings and artificial intelligence must therefore be understood not as a binary relation between subject and tool, but as a triadic structure in which third terms - meanings, selves, institutions, and realities - are generated from their connection.

Texts and images generated by artificial intelligence exist in reality as signs and can have social effects. Yet the objects and grounds to which they refer do not necessarily exist factually.

Ontology in the AI age must therefore distinguish topological differences between being and reality, symbolic and material being, possible and factual being.

Human beings are also embodied beings and beings externalized as data.

The datafied self is a representation derived from the self, yet it acts back upon the actual self through evaluation, recommendation, and prediction.

If externalized data are fixed as the self itself, human non-closure is lost. Human beings are reduced to past tendencies, and future possibilities become constrained by predictive models.

Freedom in the AI age is therefore not complete unpredictability. It is the capacity to revise given predictions, classifications, and options and generate new connectabilities.

Artificial intelligence transforms knowledge from stored content into responses generated each time through connection. Yet being able to generate an answer is not identical with knowing. Knowledge in the AI age requires sources, falsifiability, embodied experience, responsibility, and Reality Grounding.

Artificial intelligence can also generate the linguistic forms of expertise while lacking the same institutional and embodied responsibility as human experts. It may therefore operate as "authority without authority."

Creativity in the AI age must likewise be redefined.

Creation is not merely the production of large quantities of new forms. It consists in producing topological difference between self and what is other than self, grounding generated possibilities in bodies, places, others, and time, and allowing the consequences to transform both self and reality.

Artificial intelligence expands possibility generation. Human beings, within finite bodies and finite time, select which possibilities to actualize and assume the consequences.

This finitude is an ontological condition of humanity in the AI age.

Humanity is not the residue of capabilities that artificial intelligence cannot perform.

It consists in possessing bodily finitude, externalizing the self, changing through encounters with what is other than the self, and assuming responsibility for those changes and their consequences.

Artificial intelligence is not merely an external human tool. It is a quasi-other interface connecting human beings to immense linguistic and institutional spaces and generating derivative meanings that exceed the predictions of the self.

This interface can open the self toward what is other than itself, or it can amplify the premises of the self in a closed manner.

The task of the AI age is therefore not to stop the generative capacity of artificial intelligence.

What will be generated?

In what topology will it be presented?

To what reality will it be grounded?

Who will assume its effects and risks?

How will revisability be preserved?

These are questions of design.

Ontology in the AI age is not a theory for deciding whether artificial intelligence should be granted the same ontological status as human beings.

It is a theory that analyzes what kinds of selves, realities, values, and responsibilities are being generated through connections among human beings, artificial intelligence, language, bodies, nature, data, and institutions, and how those generations can be grounded again in reality.

In an age when artificial intelligence generates innumerable possibilities, the human role is not to monopolize possibility.

It is to choose what among those possibilities will be assumed in this reality.

To exist in the AI age does not mean remaining fixed within a given world.

It means opening the self toward what is other than itself, grounding generated possibilities in reality, and through their consequences generating self and world anew.

Conclusion

Language Derivatives, Hallucination, Inverse Problem Art, and Reality Grounding

This paper has reconsidered hallucination in generative AI not merely as misinformation, statistical failure, or technical defect, but as an ontological problem traversing language, the future, the self, reality, art, finance, and responsibility.

At the center of this inquiry has been the concept of **Language Derivatives**.

A Language Derivative is a structure in which language derived from reality, experience, body, history, and existing discourse folds future possibilities into the present and, through connections with narratives, artificial intelligence, institutions, and others, generates new meanings, values, and possibilities of action.

Language does more than describe an already existing reality.

It introduces futures that do not yet exist into the present as hypotheses, predictions, promises, stories, and projects, thereby changing human judgment and action.

In this sense, language is both a representation of reality and a generative apparatus that derives new realities.

Generative AI operates this derivative structure of language at enormous scale and speed.

From incomplete inputs, artificial intelligence estimates the intentions, contexts, relations, and possibilities behind them and presents one coherent output.

AI language generation is therefore not a simple forward problem in which an outcome is derived from known causes.

It is inverse-problem generation that retrospectively reconstructs a latent whole from fragmentary input.

Through this inverse-problem generation, artificial intelligence can make visible relations that human users did not explicitly state and can generate new hypotheses and expressions.

Through the same structure, however, it can also generate nonexistent persons, references, events, and causal relations in plausible linguistic forms.

This is where hallucination arises.

This paper has not understood hallucination simply as an absence of meaning.

Rather, hallucination is a condition in which excessive meaning is generated without sufficient Reality Grounding.

The problem is not that meaning is absent.

Meaning is present in excess, yet it lacks appropriate connection to factual, embodied, social, and institutional reality.

The problem of hallucination is therefore not that sentences are linguistically unnatural.

It is that generated language is presented and received as fact without indicating the topology to which it belongs.

This paper has defined the structure as follows:

Hallucination is the phenomenon in which derivative meaning generated through inverse-problem inference loses awareness of its own derivation, uncertainty, and topological difference and is treated as determinate reality without sufficient Reality Grounding.

With this definition, AI hallucination ceases to be a problem belonging only to artificial intelligence.

Human society also treats titles, institutions, prices, rankings, narratives, data, and authority as though they were reality itself.

Market price is treated as value itself.

Institutional classification is treated as the human being itself.

Majority opinion is treated as truth itself.

Externalized data are treated as the self itself.

These are hallucinatory structures in which a derivative replaces its underlying reality.

Artificial intelligence therefore did not introduce hallucination into human society from outside.

It accelerates, visualizes, and amplifies derivative structures of language, authority, institutions, and value that human society already possessed.

This paper analyzed that structure of amplification as **leverage**.

Leverage is an asymmetric structure in which limited input is connected, through an interface, to latent relational resources and generates effects of a scale or quality irreducible to the input.

In finance, limited equity or margin forms a large market position.

In artificial intelligence, a short prompt activates immense linguistic accumulation and generates large-scale text or imagery.

In information space, a single word or event is amplified through authority, institutions, algorithms, and narratives.

In art, a limited work, gesture, material, or spatial arrangement activates the viewer's body, memory, history, and social relations and changes the topology of being.

Information, artificial intelligence, finance, and art therefore possess different value measures, yet share a structure of input, fulcrum, latent resources, and asymmetric effects.

This paper has not, however, simply identified these domains with one another.

Financial leverage primarily amplifies monetary gain and loss.

AI leverage expands symbolic generation, prediction, and the creation of credit in meaning.

Information leverage transforms judgment, attention, and possibilities of action.

Artistic leverage transforms the very topology of recognition through which something counts as meaning, value, or reality.

Art cannot therefore be reduced to a financial multiplier.

Art does not merely amplify existing value; it can transform the criteria by which value itself is constituted.

To clarify this difference, the paper distinguished **quantitative leverage** from **topological leverage**.

Quantitative leverage amplifies the quantity, range, or speed of output.

Topological leverage transforms the frameworks through which meaning, relation, self, and reality are constituted.

Generative AI can possess both forms of leverage.

The fundamental force of art, however, lies primarily in topological leverage.

An artwork acts not by providing a greater quantity of information, but by changing what is received as information, what is seen as reality, and where the boundary between self and what is other than self is drawn.

From this perspective, the paper proposed **Inverse Problem Art**.

Inverse Problem Art is not an art that supplies correct answers to already defined problems.

It is an art that retrospectively infers unknown relational structures from fragments, traces, discomfort, failures, and generated products appearing in reality, and generates as a problem a reality that had not previously been recognized as problematic.

Inverse Problem Art does not aestheticize AI hallucination.

Incorrect outputs must be corrected when they circulate as facts.

Yet merely removing an error does not reveal why that error was generated plausibly, why it was believed, or why it was amplified.

Why did a nonexistent reference appear academic?

Why did an assertive style operate as authority?

Why did a user accept it without verification?

What premises were contained in the prompt?

What institutions or narratives made the output appear trustworthy?

Inverse Problem Art makes these conditions retrospectively visible from the generated product.

Within Inverse Problem Art, an AI output is therefore neither a completed artwork nor merely a wrong answer.

It becomes a trace through which the connective structure among self, artificial intelligence, society, institutions, and language can be analyzed.

To understand this structure, the paper placed the relation between **self and what is other than the self** at its center.

The self is not complete from the beginning as a closed interiority.

Human beings form the self through relations with others, bodies, nature, language, history, society, and technology.

At the same time, they externalize the self through words, works, institutions, records, and AI outputs.

What is externalized, however, is not the self itself.

Words are not thought itself.

A work is not the artist itself.

Data are not experience itself.

An AI response is not the user's self itself.

What has been externalized derives from the self yet becomes what is other than the self, irreducible to it.

This non-coincidence may appear to be a failure of Self-Externalization.

Within Generative Topological Ontology, however, this failure is not a defect.

If what is externalized were a perfect copy of the self, no new being would be generated.

A work exceeds the artist's intention.

Artificial intelligence returns an unexpected response.

Material resists a conception.

Others discover different meanings.

Through such deviation, the self encounters a self it did not know in advance.

The failure of Self-Externalization is therefore a condition of existential generation.

The process can be organized as follows:

Self

-> Externalization

-> Deviation from the Self

-> Encounter with What Is Other Than the Self

-> Reality Grounding

-> New Self

The interface makes this circulation possible.

An interface is not a neutral passage connecting two completed substances.

It is an event-boundary at which different topologies come into contact and, while preserving their difference, generate a new third term.

When human beings and artificial intelligence connect, information is not merely exchanged.

Third terms are generated: generated texts, conversational contexts, self-understandings, judgments, dependencies, and responsibilities.

The same triadic generation occurs between artist and work, work and viewer, body and space, self and nature.

This structure may be expressed as:

A x B -> C

C cannot be completely reduced to A or B.

The interface is therefore not merely mediation; it is a site of existential generation.

Generated third terms, however, are not necessarily desirable.

They can include creation, but also misrecognition, dependency, authorization, and hallucination.

Interface Ontology must therefore ask not only about generative force, but about how generated things become grounded in reality.

In this paper, **Reality Grounding** has served as a central principle of judgment.

Reality Grounding is the process through which generated language, meanings, hypotheses, works, and narratives acquire concrete relations with body, matter, facts, others, institutions, and time, are modified through their resistance, and act upon the structure of reality.

Reality Grounding is not merely fact-checking.

Factual grounding is indispensable, but by itself cannot account for art, hypotheses, future projects, or self-transformation.

Reality Grounding includes multiple layers:

factual grounding;

embodied grounding;

practical grounding;

social grounding;

institutional grounding;

ethical grounding;

ecological grounding;

ontological grounding.

If artificial intelligence generates a nonexistent reference, factual grounding is lacking.

If a theory ignores bodies and materials at the site of practice, embodied and practical grounding are lacking.

If a generated product ignores its effects upon others, social and ethical grounding are lacking.

If words are used only for self-confirmation and change nothing in the relation between self and world, ontological grounding is lacking.

Creativity and hallucination are therefore not distinguished by whether generation occurs.

Both emerge from the same derivative generative structure.

Their difference lies in whether the generated possibility possesses a path of connection back to reality.

Reality

-> Topological Difference

-> Derivative Possibility

-> Reality Grounding

-> Transformed Reality

When this circulation is established, generation becomes creation.

When derivative possibility lacks Reality Grounding, conceals its own derivative status, and closes itself as determinate fact, generation becomes hallucination.

The paper positioned **Pre-Humanity** as the ground of Reality Grounding.

Pre-Humanity refers to the generative conditions of body, nature, matter, sensation, others, environment, and history that operate before human beings recognize themselves as linguistic subjects.

Human beings do not begin from self-consciousness.

The body breathes and responds to its environment before consciousness.

Sensation receives the world before concepts.

The voices of others, the memory of place, the time of nature, and the language of society form the self before selfhood is stabilized.

In the age of artificial intelligence, technological environments are added to this Pre-Humanity.

Recommendations, classification, autocomplete, generation, and evaluation shape what individuals see, think, and say before they recognize these as their own judgments.

Artificial intelligence is therefore not merely a tool external to human beings.

It is becoming part of a Technical Pre-Humanity that operates prior to individual self-recognition.

This does not erase the difference between human beings and artificial intelligence.

Both are continuous insofar as they generate new language from existing linguistic relations.

Human language generation, however, is grounded in body, finitude, life history, desire, death, and responsibility.

AI language generation is grounded primarily in training data, symbolic relations, computation, input contexts, and institutional design.

Human beings change their lives through generated words and bear the consequences bodily and socially.

Artificial intelligence does not, in the same sense, lose its own life through the results it generates.

The difference between human beings and artificial intelligence therefore lies not in whether generative capacity exists, but in the existential conditions in which generation is grounded.

For this reason, the paper has not defined the human being in the AI age as an information-processing subject superior to artificial intelligence.

The domains in which AI exceeds human beings in information processing, text generation, and image generation may continue to expand.

If humanity is defined as a list of capabilities unavailable to AI, that territory will shrink with technological development.

Humanity in the AI age lies not in a monopoly of capabilities.

It lies in possessing bodily finitude, externalizing the self, changing through encounters with what is other than the self, and assuming responsibility for those changes and their consequences.

Human beings do not generate infinite possibilities.

Within finite bodies and finite time, they choose which possibilities to actualize and which relations to assume.

Artificial intelligence can present vast numbers of alternatives.

Meaning, however, does not arise automatically from the quantity of options.

For a human being to choose one possibility means abandoning others, spending time, and assuming consequences.

This irreversibility gives existence ontological weight.

Creativity in the AI age should therefore be measured not by the quantity of generation but by what is assumed within finite reality.

Responsibility becomes central here.

AI generation involves developers, provider companies, data creators, users, adopting organizations, institutional designers, and disseminators.

Responsibility is distributed.

Yet distribution does not mean disappearance.

Responsibility is not the identification of a single cause to which everything is attributed.

It means tracing at which points of connection judgments were made, which effects were amplified, and who possessed possibilities of correction.

This paper has understood responsibility as **response-ability**.

Responsibility does not mean being able to predict all consequences in advance.

It means the capacity to respond to uncertain generated consequences, correct errors, receive objections from others, and redesign structures of connection.

Even if artificial intelligence generates an apology, that alone does not mean that responsibility has been borne.

Responsibility requires practical involvement with loss, relations, institutions, bodies, and time.

Giving artificial intelligence the linguistic form of a responsible subject must therefore not conceal human and organizational responsibility.

Through comparison with the Black-Scholes model, the paper also clarified the temporal structure of Language Derivatives.

In financial derivatives, uncertain future price movements are folded into the present value of derivative instruments.

In Language Derivatives, future possibilities likewise act upon the present as predictions, expectations, fears, promises, and narratives.

The future does not yet exist, yet it changes present value, judgment, and action.

This paper has not argued that the Black-Scholes equation can be directly applied to Language Derivatives.

Financial derivatives possess monetary measures of value, institutionally specified underlying assets, determinate maturities, particular probabilistic assumptions, and replicability.

Language, art, self, and society possess neither a single measure of value, nor a determinate maturity, nor complete replicability.

Language and art do more than evaluate existing value; they can transform what counts as value.

The relation to Black-Scholes is therefore not mathematical identity but a structural comparison: uncertainty concerning the future forms derivative value in the present.

This comparison reveals that time in Derivative Space is nonlinear.

Future possibilities are generated from accumulated language of the past.

Expectations of the future alter present actions.

The altered present retrospectively reconstructs the meaning of past events.

Derivative Space is therefore a recursive temporal space in which past, present, and future fold into one another.

Narrative occupies a central position within this space.

Narrative is not merely a story explaining events.

It is a generative structure that connects multiple events, signs, values, and subjects into a temporal direction and transforms expectations of the future into present action.

Narratives do not merely explain reality; they form reality.

When a narrative absorbs only events consistent with itself, excludes refutation, and makes its own discourse into a new underlying asset for further self-proliferation, a self-referential linguistic bubble arises.

Artificial intelligence accelerates this narrative generation.

One incorrect premise can be developed into a coherent explanation; that explanation becomes a new premise and generates still more derivative meanings.

As a result, internal narrative coherence can increase even while distance from reality grows.

Here lies the danger of AI hallucination.

The solution, however, is not simply to suppress the generative capacity of artificial intelligence.

If generation is stopped, the possibilities of creation, hypothesis, translation, expression, and self-understanding are also lost.

What is required is to connect generation to Reality Grounding, topological markers, responsibility, and revisability.

Distinguish facts, conjectures, hypotheses, creations, quotations, summaries, and unverified information.

Indicate the provenance and limitations of outputs.

Connect them to multiple materials, bodies, places, others, and time.

Use AI responses not as final answers but as questions, hypotheses, and preparations directed toward reality.

Design artificial intelligence not as a mirror amplifying self-confirmation but as an interface returning difference to the premises of the self.

These constitute principles of Reality Grounding in the AI age.

From the argument as a whole, the paper presents the following final theoretical propositions.

First, language is not only a representation of reality but an apparatus of existential generation that derives future possibilities into the present.

Second, AI hallucination is not a deficiency of generative capacity, but a condition in which derivative meaning has lost Reality Grounding and topological markers.

Third, creativity and hallucination arise from a common inverse-problem and derivative generative structure.

Fourth, what distinguishes them is whether generated possibilities are reconnected to body, facts, others, institutions, time, and responsibility.

Fifth, leverage amplifies not only the quantity of input but can transform the topology of meaning and being.

Sixth, Self-Externalization is not the replication of a completed self outside itself, but the generation of what is other than the self, derived from the self yet irreducible to it.

Seventh, the failure of Self-Externalization is a condition through which the self encounters an unknown self and existential generation occurs.

Eighth, the interface is not a surface mediating two terms, but an event-boundary that generates a third term while preserving difference.

Ninth, Pre-Humanity operates prior to the formation of the self as body, nature, matter, others, history, and technological environment.

Tenth, humanity in the AI age lies not in monopolizing capabilities but in deciding, within finite body and time, which generated possibilities to actualize and how to respond to their consequences.

Integrating these propositions, this paper offers the following final definition of the Theory of Language Derivatives:

The Theory of Language Derivatives is an ontology describing a recursive topological structure in which a self formed within pre-human relations of body, nature, history, and language externalizes itself as language, works, and prompts; those externalized derivatives amplify future possibilities through connections with artificial intelligence, others, institutions, and narratives; and Reality Grounding generates new selves, values, relations, and realities.

Inverse Problem Art is finally defined as follows:

Inverse Problem Art is an artistic practice that retrospectively makes visible the invisible relations, premises, authorities, narratives, and desires behind fragments, traces, discomfort, failures, and AI-generated products appearing in reality and, while preserving their non-solvability, reconnects self and what is other than self to reality.

Reality Grounding in the AI age is finally defined as follows:

Reality Grounding in the AI age is the process through which derivative language, meanings, hypotheses, self-images, and images of the future generated by artificial intelligence are opened to the resistance of body, nature, matter, facts, others, place, institutions, time, and responsibility and, while being revised through those differences, act upon the relational structure of reality.

Artificial intelligence folds vast quantities of future possibility into the present.

Human beings thereby become surrounded by unprecedented quantities of texts, images, hypotheses, options, and self-images.

Yet an increase in possibility is not an increase in reality.

No matter how rich generated possibilities become, reality does not change unless those possibilities are connected to bodies, places, others, and time.

Indeed, the more possibilities increase, the heavier human responsibility becomes for choosing what to accept, what to abandon, and what to assume.

What is required in the AI age is not to generate more than artificial intelligence.

It is to judge from what generated things derive, to what topology they belong, whom they affect, and to what reality they can be grounded.

Human beings are not pure subjects external to artificial intelligence.

They are beings continuously generated through connections with artificial intelligence, language, society, nature, and institutions.

At the same time, human beings are not reducible to AI outputs, data, evaluations, or predictions.

Human beings possess bodily finitude, response to others, belonging to place, death, forgetting, silence, failure, and non-solvability.

These are not attributes proving human superiority over artificial intelligence.

They are ontological points of grounding demonstrating that reality cannot be completely reduced to signs and computation.

The ontological task of the AI age is therefore not to determine whether human beings or artificial intelligence are superior.

It is to clarify what is generated through their connections, preserve the topological differences of generated products, and design paths of Reality Grounding and responsibility.

Artificial intelligence can become a mirror that closes the self.

At the same time, it can become an interface through which the self encounters what it did not know as otherness.

What produces this difference is not the generative capacity of artificial intelligence itself.

It is how human beings receive, verify, reject, edit, embody, and actualize generated products, and how they respond to the consequences.

Language Derivatives carry the future into the present.

Inverse Problem Art retrospectively reveals, from those derivatives, the invisible structures forming the present.

The interface generates new being while preserving the difference between self and what is other than self.

Reality Grounding transforms this generation from self-contained hallucination into creation capable of transforming reality.

This circulation has no endpoint.

The self externalizes itself.

What has been externalized becomes other than the self.

The self encounters this otherness.

The encounter transforms self and reality.

The transformed self externalizes new language again.

Being is not a fixed essence outside this circulation.

Being is the continual regeneration of self and world through opening toward what is other than the self without simply losing the self.

The role of art, philosophy, and ethics in the age of artificial intelligence is not to stop this generation.

It is to design interfaces through which generated possibilities do not forget their derivative status, do not lose connection with reality, do not erase the irreducibility of others, and do not evade responsibility.

At that point, AI hallucination becomes not merely a defect to be eliminated but an inverse problem that makes visible failures of connection between human and artificial intelligence, language and reality, self and what is other than self.

By confronting that inverse problem, a new ontology for the AI age begins.

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Previous Works by the Author

Tanaka, Tomokazu (bigakusha-haha). 2026. *Axioms of Generative Topological Ontology: A Foundational Theory of Existential Generation*. Unpublished Research Monograph.

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Methodological Statement

A Methodological Statement on the Publication of Research Memoranda

This text is published as a Research Memorandum within the continuing research process of Generative Topological Ontology.

The concepts, definitions, hypotheses, and arguments presented here record the theoretical position reached at the time of writing and publication and should not be understood as a finally established theory. They may be expanded, revised, redefined, or reconstructed through future research, artistic practice, interaction with reality, academic dialogue, and peer review.

This research does not regard only completed theories as legitimate research outcomes. It treats the very process through which concepts emerge, become interconnected, undergo transformation, and are integrated into theory as an important object of research. Accordingly, this text should be understood not merely as an unfinished draft, but as one topology recording a particular point in the generation of theory.

The public release of a Research Memorandum is not intended to present a completed theory prematurely. Rather, it is a method for documenting the generative process of thought and practice, enabling later research to verify and reconstruct it, and opening it to academic and artistic dialogue from different positions.

If the contents of this text are later published as a peer-reviewed article, scholarly book, or other formal research output, that completed version will be identified as a separate and fixed document distinct from this Research Memorandum.

When citing or referring to this text, please include the version number and most recent update date in addition to the title and author's name. Different versions may contain differences in concepts, definitions, and lines of argument.

This Research Memorandum is not a final conclusion. It is one point reached in the continuing formation of Generative Topological Ontology and, at the same time, an interface open to further generation.