COSINIA

COSINIA RESEARCH SERIES

Mathematical Foundations of Intrinsic Memory

A Formal Model of Semantic Continuity

AUTHOR
Ray Ketabchi
Reza Ketabchi
VERSION
1.0
PUBLISHED
July 2026

Abstract

The previous papers in the Architecture of Intelligence established that intelligent behaviors operate upon a persistent Semantic World, that Intrinsic Memory provides the computational substrate required for its continuity, and that meaning emerges from the continuously evolving Semantic World through the lawful organization of persistent semantic structures. While these papers introduced the conceptual foundations of the Architecture of Intelligence, they remained primarily ontological and architectural.

The present work develops the first formal mathematical model of Intrinsic Memory. Rather than describing implementation details, it defines the mathematical objects, state transitions, invariants, and operators that govern the evolution of a Semantic World through time.

The paper introduces formal definitions for Semantic Worlds, persistent Identities, immutable Events, Identity-Centric Persistent Relations, Semantic Assertions, and Intrinsic Memory itself. It then establishes the mathematical conditions required for semantic continuity, deterministic non-mutative retrieval, and lawful semantic evolution.

These definitions provide the formal foundation upon which subsequent papers develop deterministic semantic compilation, semantic retrieval, learning, reasoning, prediction, and the computational realization implemented by the Andisheh Engine.

Scope of this Paper

This paper establishes the mathematical foundations of Intrinsic Memory.

Its purpose is not to describe implementation algorithms or engineering architecture. Instead, it introduces a formal mathematical framework capable of expressing the semantic structures and continuity principles established throughout the previous papers.

The mathematical objects defined herein constitute an abstract model of a Semantic World independent of any specific implementation. Whether realized through the Andisheh Engine or future computational architectures, every lawful implementation of Intrinsic Memory must satisfy the invariants developed in this paper.

The mathematical framework developed here serves as the basis for subsequent papers on deterministic semantic compilation, semantic retrieval, semantic hashing, identity formation, learning, reasoning, and distributed Semantic Worlds.

The mathematical framework developed in this paper is intended to provide a formal specification of the Architecture of Intelligence rather than to introduce new results in pure mathematics. The notation, definitions, and formal structures presented herein are developed to precisely characterize the semantic entities, state transitions, and continuity invariants required by the proposed computational model. Their purpose is to establish a rigorous language for reasoning about Intrinsic Memory and Semantic Worlds, independent of any particular implementation.

Introduction

The previous papers in the Architecture of Intelligence established the conceptual foundations of persistent semantic computation. They demonstrated that intelligent behaviors operate upon a persistent Semantic World, that Intrinsic Memory provides the computational substrate required to preserve its continuity, and that meaning emerges from the continuously evolving Semantic World through the lawful organization of persistent semantic structures.

While these principles define the architecture conceptually, a scientific theory requires more than conceptual description. It requires a formal language capable of expressing semantic structures, their evolution through time, and the invariants that govern their behavior independently of any particular implementation.

The purpose of this paper is therefore to establish the mathematical foundations of Intrinsic Memory and the Semantic World it preserves. Rather than describing algorithms or engineering architecture, it introduces a formal framework through which Semantic Worlds, persistent Identities, immutable Events, Identity-Centric Persistent Relations, Semantic Assertions, and semantic continuity may be expressed with mathematical precision.

The mathematical model developed here serves two purposes. First, it provides a rigorous foundation upon which subsequent theoretical results may be derived. Second, it establishes a formal specification against which computational implementations, including the Andisheh Engine, may be evaluated. In this sense, the mathematics presented in this paper defines not a particular implementation, but the class of computational systems capable of preserving semantic continuity.

The sections that follow progressively introduce the mathematical objects constituting a Semantic World, define the lawful transitions through which that world evolves, and establish the invariants that distinguish Intrinsic Memory from conventional storage-based computational architectures.

Mathematical Preliminaries

The mathematical framework developed throughout this paper models a Semantic World as an evolving semantic structure whose state changes through the admission of successive observations. The notation introduced in this section provides a common language for expressing those structures independently of any implementation.

Capital letters denote sets of semantic entities, while lowercase letters denote individual members of those sets. Time is represented by discrete indices $t \in \mathbb{N}$, where each value of t corresponds to a successive semantic state of the world.

Mappings between semantic objects are represented by functions, while state transitions are represented by operators acting upon complete Semantic Worlds. Throughout this paper, mathematical definitions describe semantic organization rather than implementation details. Consequently, the formal objects introduced here should be understood as abstract semantic constructs whose computational realization is addressed in subsequent papers.

For every time index t, the Semantic World possesses a well-defined semantic state. As successive observations are admitted into Intrinsic Memory, the Semantic World evolves through lawful transition operators while preserving the continuity invariants developed throughout this paper.

> ***Whenever the notation $W_t \rightarrow W_{t+1}$ is used, it denotes a semantic transition from one valid world state to another. The mathematical properties governing these transitions constitute the foundation of Intrinsic Memory.***

Formal Semantic World

The Architecture of Intelligence models a Semantic World as a persistent semantic structure whose state evolves through time while preserving semantic continuity.

> ***For every time index t, the Semantic World is formally defined as $W_t = (I_t, E_t, R_t, A_t)$.***

- I_t denotes the set of persistent Identities admitted into the Semantic World up to time t.
- E_t denotes the set of immutable Events comprising the semantic history of the world.
- R_t denotes the collection of Identity-Centric Persistent Relations connecting those Identities.
- A_t denotes the set of Semantic Assertions qualifying the semantic status of admitted observations.

Together, these four collections define the complete semantic state of the Semantic World at semantic time t.

It is important to distinguish the Semantic World from any particular computational representation. The tuple W_t is not intended to describe a database schema, graph implementation, or storage format. Rather, it defines the abstract semantic state that any lawful implementation of Intrinsic Memory must preserve.

As successive observations are admitted, the Semantic World evolves through a sequence of semantic states $W_0, W_1, W_2, \ldots, W_t$, each representing the cumulative semantic organization preserved by Intrinsic Memory. This sequence forms the semantic history of the world.

The remainder of this paper develops the mathematical properties of each component of W_t, defines the lawful transitions between successive world states, and establishes the invariants required to preserve semantic continuity throughout that evolution.

Formal Identity

Identity is the fundamental unit of persistence within a Semantic World. Every persistent semantic structure ultimately derives its continuity from persistent Identities, making Identity the primary semantic reference upon which the remainder of the Semantic World is organized.

> ***Let $I_t = \{i_1, i_2, \ldots, i_n\}$ denote the set of all Identities admitted into the Semantic World at semantic time t.***

> ***Each Identity is defined as $i = (o_i, H_i, s_i)$.***

- o_i is the origin Event through which the Identity entered the Semantic World.
- H_i denotes the semantic history associated with the Identity.
- s_i denotes the current semantic state of the Identity.

> ***The semantic history of an Identity is defined as $H_i = \{ e \in E_t \mid i \in P(e) \}$, where P(e) denotes the set of participating Identities within Event e.***

Every Identity possesses a unique semantic origin. Formally, $\forall i \in I, \exists! \, o_i \in E$, indicating that every Identity is admitted into the Semantic World through exactly one origin Event.

Identity continuity requires that once admitted into the Semantic World, an Identity remains semantically persistent throughout subsequent world states. Formally, $I_t \subseteq I_{t+1}$.

An Identity may transition between semantic states, such as active or historical, but it is never removed from the Semantic World.

> ***The semantic state of an Identity is represented by $s_i \in$ {active, historical}.***

Historical Identities continue to participate in semantic history even after they cease participating in new observations. Their preservation ensures that semantic continuity extends across the complete history of the Semantic World.

Formal Event

Events constitute the immutable history of the Semantic World. While Identities provide persistent semantic reference, Events record every observation admitted into the Semantic World.

> ***Let $E_t = \{e_1, e_2, \ldots, e_m\}$ denote the set of Events admitted up to semantic time t.***

> ***Each Event is defined as $e = (P_e, \Phi_e, T_e, \alpha_e)$.***

- P_e is the set of participating Identities together with their semantic roles.
- Φ_e denotes the semantic event structure.
- T_e represents the temporal information associated with the Event.
- α_e denotes its Semantic Assertion.

> ***Participants are represented as $P_e = \{(r_1, i_1), (r_2, i_2), \ldots, (r_n, i_n)\}$, where each semantic role r_k is associated with a persistent Identity i_k.***

Temporal ordering is represented by T_e = (t_obs, t_valid), where t_obs denotes the observation time and t_valid denotes the semantic time to which the observation refers. In many cases these values coincide, while historical or future assertions may distinguish them.

The defining mathematical property of an Event is immutability.

> ***For every Event, $e \in E_t \Rightarrow e \in E_{t+k}$ for all $k \geq 0$, and $\text{content}_{t+k}(e) = \text{content}_t(e)$.***

An admitted Event is therefore never modified, replaced, or deleted. Subsequent observations extend the Semantic World by creating additional Events rather than altering existing ones.

Formal Persistent Relations

Consequently, the evolution of Persistent Relations preserves semantic continuity while remaining completely traceable to the immutable history of the Semantic World.

> ***Let R_t denote the set of all Persistent Relations existing at semantic time t.***

> ***Each relation is represented as $r = (i_a, \tau_r, i_\beta, H_r)$.***

- i_a and i_β are persistent Identities.
- τ_r denotes the semantic relation type.
- H_r denotes the relation history.

Unlike isolated graph edges, Persistent Relations evolve through immutable Events while maintaining continuity of semantic reference.

Every relation possesses semantic provenance.

> ***There exists a supporting set of Events $E_r \subseteq E_t$ such that $r = F(E_r)$, where F denotes the lawful relation construction operator.***

As new observations are admitted, relation state evolves according to $R_{t+1} = U(R_t, E_{t+1} \setminus E_t)$, where U denotes the lawful relation-update operator.

Consequently, relation evolution preserves semantic continuity while remaining completely traceable to immutable semantic history.

Semantic Assertions

Every admitted Event possesses a Semantic Assertion describing the semantic status under which the observation enters the Semantic World.

> ***Let A_t denote the assertion space associated with semantic state W_t.***

> ***Each assertion is defined as $\alpha = (p, m, \varepsilon, c)$.***

- p denotes polarity.
- m denotes modality.
- ε denotes epistemic status.
- c denotes confidence.

Polarity determines whether an observation is affirmed or negated, where $p \in \{+, -\}$.

Modality distinguishes semantic commitment, where $m \in$ {factual, possible, hypothetical, conditional}.

Epistemic status records how an observation became known, where $\varepsilon \in$ {observed, reported, inferred, assumed}.

Confidence is represented by $c \in [0,1]$ and expresses the degree of confidence associated with the assertion while remaining independent of the underlying semantic structures.

Contradictory assertions are not destructive. If two assertions qualify the same persistent semantic structures, $\alpha_1 \neq \alpha_2$, both may coexist within the Semantic World ($\{\alpha_1, \alpha_2\} \subseteq A_t$), thereby preserving the complete history of observations rather than eliminating contradictory evidence.

Semantic World Transitions

A Semantic World evolves through the lawful admission of successive observations.

> ***Let O denote the observation operator, $O : W_t \times x \to W_{t+1}$, where x represents a newly admitted semantic observation.***

Every lawful transition must preserve the semantic continuity of the Semantic World established by the previous world state.

> ***Formally, $W_t \preceq W_{t+1}$, where $\preceq$ denotes semantic extension.***

Semantic extension requires that previously admitted semantic structures remain preserved while new structures are incorporated.

Consequently, $I_t \subseteq I_{t+1}$ and $E_t \subseteq E_{t+1}$, while every Persistent Relation and Semantic Assertion remains traceable throughout successive world states.

The observation operator therefore does not replace an existing Semantic World. Instead, it constructs a lawful semantic extension whose history strictly contains that of its predecessor.

> ***The sequence $W_0 \preceq W_1 \preceq \cdots \preceq W_t$ therefore represents the continuously evolving semantic history preserved by Intrinsic Memory.***

Formal Definition of Intrinsic Memory

The previous sections introduced the mathematical objects that collectively constitute a Semantic World. Intrinsic Memory is defined not as one of these objects, but as the computational substrate responsible for preserving the continuity of the Semantic World throughout its lawful evolution.

Let M denote an Intrinsic Memory.

Its fundamental operation is the lawful admission of semantic observations through the observation operator O, producing the state transition $M : (W_t, x) \rightarrow W_{t+1}$, where W_t is the current Semantic World, x is a newly admitted semantic observation, and W_{t+1} is the resulting Semantic World.

Unlike conventional storage systems, Intrinsic Memory is not characterized by its ability to store information, but by its obligation to preserve semantic continuity throughout every valid transition.

> *A state transition is considered lawful if and only if it preserves the semantic invariants defined throughout this paper.*

> *Formally, the transition $W_t \rightarrow_m W_{t+1}$ is lawful precisely when $I(W_t, W_{t+1})$ = true, where I denotes the collection of semantic invariants governing Intrinsic Memory.*

Intrinsic Memory is therefore defined as the class of computational systems whose lawful state transitions preserve the continuity of a Semantic World throughout its continuous evolution.

Semantic Continuity

The defining property of Intrinsic Memory is the preservation of the continuity of the Semantic World throughout its lawful evolution.

Semantic continuity describes the extent to which a Semantic World preserves its persistent semantic structures and their lawful organization as it evolves through successive observations.

> ***Formally, semantic continuity is represented by $SC(W_t, W_{t+1}) \in [0,1]$, measuring the degree to which the transition from W_t to W_{t+1} preserves the continuity of the Semantic World established by previous observations.***

- SC = 1 represents perfect semantic continuity.
- SC = 0 represents complete loss of semantic continuity.
- Values between 0 and 1 represent partial preservation of semantic continuity.

Semantic continuity depends upon the preservation of the fundamental semantic invariants introduced throughout this paper, including Identity Persistence, Event Immutability, Relation Provenance, Semantic Assertion Preservation, and History-Preserving World Extension.

The Architecture of Intelligence treats semantic continuity as the defining mathematical property of Intrinsic Memory. Any lawful transition between Semantic Worlds preserves semantic continuity, while violations of the fundamental invariants reduce it.

Deterministic Non-Mutative Retrieval

Retrieval is fundamentally different from observation. Observation extends the Semantic World through lawful semantic admission, whereas retrieval performs computation over the existing Semantic World without altering its semantic organization.

> *Let Q denote the space of semantic queries and Y the corresponding answer space. Semantic Retrieval is defined as the function $\rho : Q \times W_t \rightarrow Y$.*

For every query $q \in Q$, the retrieval function returns a semantic result $y = \rho(q, W_t)$, computed from the current Semantic World.

Determinism requires that equivalent Semantic Worlds always produce identical retrieval results for equivalent queries. Formally, $q_1 = q_2 \wedge W_{t1} = W_{t2} \Rightarrow \rho(q_1, W_{t1}) = \rho(q_2, W_{t2})$.

The defining property of Semantic Retrieval, however, is non-mutation. Executing retrieval shall not modify the Semantic World.

> *If Wbefore and Wafter denote the Semantic World immediately before and after retrieval, then Wbefore = Wafter.*

Retrieval therefore computes semantic results without creating, deleting, modifying, or reorganizing any persistent semantic structures within the Semantic World preserved by Intrinsic Memory.

> *Observation changes the Semantic World. Retrieval does not.*

Fundamental Invariants

The mathematical objects introduced throughout this paper constitute a lawful Semantic World only if every state transition preserves a common set of semantic invariants. These invariants define the mathematical properties that distinguish Intrinsic Memory from conventional storage-based systems.

Once admitted into the Semantic World, an Identity remains part of its persistent history.

> $I_t \subseteq I_{t+1}$.

Identity state may evolve from active to historical, but the Identity itself is never removed.

Every admitted Event remains permanently preserved.

> $E_t \subseteq E_{t+1}$.

Furthermore, the content of every Event remains invariant throughout every future Semantic World.

Every Persistent Relation derives from one or more immutable Events.

> *For every $r \in R_t$, there exists $E_r \subseteq E_t$ such that $r = F(E_r)$, where F is the lawful relation construction operator.*

No Persistent Relation exists independently of the immutable history of the Semantic World.

Semantic Assertions qualify observations without replacing previous assertions. Distinct assertions concerning identical semantic structures may coexist.

> *$\alpha_1 \neq \alpha_2$ does not imply α_1 replaces α_2. Instead, $\{\alpha_1, \alpha_2\} \subseteq A_t$.*

Every lawful transition extends the history of the Semantic World rather than replacing it.

> *$W_t \preceq W_{t+1}$, where $\preceq$ denotes semantic extension.*

The history of the Semantic World therefore grows monotonically throughout its lawful evolution under Intrinsic Memory.

Semantic Retrieval preserves the complete state of the Semantic World.

> *For every query, $\rho(q, W_t) = y$ while Wbefore = Wafter.*

Retrieval therefore constitutes computation over the Semantic World rather than modification of it.

Fundamental Axioms

The mathematical framework developed throughout this paper is founded upon a small collection of axioms that characterize every lawful Intrinsic Memory. These axioms are not implementation-specific. Rather, they define the fundamental properties that every computational realization preserving a Semantic World must satisfy.

Collectively, these axioms establish the mathematical foundation upon which the remainder of the Architecture of Intelligence is constructed.

Every Identity admitted into a Semantic World remains part of its persistent history.

> $I_t \subseteq I_{t+1}$.

An Identity may transition between semantic states, but it is never removed from the Semantic World.

Every Event admitted into a Semantic World remains permanently preserved.

> $E_t \subseteq E_{t+1}$.

No lawful computation may modify or replace an existing Event.

Every Persistent Relation derives its continuity from the Identities it connects and its provenance from immutable Events.

> ***For every $r \in R_t$, there exists a supporting Event set $E_r \subseteq E_t$ such that $r = F(E_r)$.***

Semantic Assertions qualify observations without replacing previous Semantic Assertions. Distinct assertions concerning the same semantic structures may coexist within the Semantic World. Consequently, semantic contradiction is preserved rather than eliminated.

Every lawful observation extends the Semantic World while preserving its complete history.

> ***$W_t \preceq W_{t+1}$, where $\preceq$ denotes semantic extension.***

The history of the Semantic World therefore grows monotonically through successive observations.

Semantic Retrieval performs computation over the Semantic World without altering its persistent semantic structures or their lawful organization.

> ***For every semantic query, Wbefore = Wafter.***

Retrieval therefore preserves the complete state of the Semantic World maintained by Intrinsic Memory.

These six axioms collectively define the mathematical contract governing Intrinsic Memory. Any computational system satisfying these axioms preserves the continuity of a Semantic World according to the Architecture of Intelligence.

Derived Propositions

The preceding axioms immediately imply several fundamental properties of Intrinsic Memory and the Semantic Worlds it preserves. Although simple, these propositions establish important consequences that distinguish Semantic Worlds from conventional storage-based computational systems.

If Intrinsic Memory satisfies the Immutable Event Axiom, then the set of Events grows monotonically over time.

> $t_1 < t_2 \Rightarrow E_{t1} \subseteq E_{t2}$.

Therefore, every Event admitted into the Semantic World remains permanently preserved, and the history of the Semantic World grows monotonically through successive observations.

From Axiom 1 it follows that every previously established Identity remains available for future computation over the Semantic World. Consequently, semantic reference remains stable throughout successive Semantic Worlds.

Because Semantic Retrieval is deterministic and non-mutative, equivalent Semantic Worlds always produce identical retrieval results for equivalent semantic queries. Semantic Retrieval therefore behaves as a deterministic mathematical function rather than a state-modifying computation.

Since Persistent Relations derive from immutable Events and persistent Identities, every persistent semantic structure within the Semantic World remains traceable to the immutable history through which it emerged. The Semantic World therefore preserves complete semantic provenance throughout its lawful evolution.

Because Semantic Assertions coexist rather than overwrite one another, contradictory observations remain explicitly represented within the Semantic World. Contradiction therefore becomes part of the world's history rather than a source of information loss.

From Axioms 1 through 5 it follows that every lawful Semantic World transition preserves the complete history accumulated by previous world states. Successive Semantic Worlds therefore represent continuous semantic evolution rather than independent semantic snapshots.

These propositions constitute the first formal consequences of the Architecture of Intelligence and establish the mathematical properties required for deterministic computation over a continuously evolving Semantic World. They provide the formal basis for the subsequent development of semantic compilation, retrieval, learning, reasoning, prediction, and the Andisheh Engine.

Relationship to Intelligent Behaviors

The mathematical framework developed throughout this paper defines the Semantic World and the laws governing its evolution. It does not attempt to formalize intelligent behaviors themselves.

Within the Architecture of Intelligence, intelligent behaviors are understood as computational operators acting upon a persistent Semantic World whose continuity has already been established by Intrinsic Memory.

Learning extends the Semantic World through lawful observation admission. Reasoning derives new semantic conclusions from the existing organization of the Semantic World. Planning evaluates possible future Semantic World states, while prediction estimates future Events consistent with the current Semantic World.

These behaviors neither create nor replace meaning independently. Rather, they operate upon the continuously evolving Semantic World whose mathematical foundations have been established in this paper.

The formalization of these computational operators constitutes the subject of subsequent papers in this research series.

Experimental Validation

Although the mathematical framework presented in this paper is independent of any particular implementation, its defining properties are experimentally testable.

The Andisheh Engine serves as a reference implementation of Intrinsic Memory whose computational behavior may be evaluated against the mathematical invariants established throughout this paper.

- Preservation of persistent Identity across repeated observations.
- Immutable Event history throughout successive Semantic Worlds.
- Deterministic Semantic Retrieval under identical world states and queries.
- Non-mutative Retrieval that preserves semantic state.

- Preservation of contradictory Semantic Assertions without information loss.
- Minimization of Semantic Entropy through lawful semantic evolution.

These properties provide measurable criteria by which Intrinsic Memory may be compared with conventional storage-based architectures, vector-based memory systems, and context-based language models with respect to their ability to preserve a lawful Semantic World.

The purpose of such evaluation is not to validate the Architecture of Intelligence through implementation alone, but to determine whether a computational system faithfully preserves the mathematical properties required for the lawful evolution of a Semantic World.

Conclusion

The previous papers in this research series introduced the conceptual foundations of the Architecture of Intelligence by defining Intrinsic Memory, the Semantic World, Semantic Topology, and the persistent semantic structures from which meaning emerges. The present paper has transformed those conceptual foundations into a formal mathematical framework.

The Semantic World has been defined as a mathematical state composed of persistent Identities, immutable Events, Identity-Centric Persistent Relations, and Semantic Assertions. Intrinsic Memory has been formalized as the computational substrate responsible for preserving the continuity of the Semantic World through lawful world transitions governed by explicit mathematical invariants.

These definitions establish the first formal specification of the Semantic World and its continuity within the Architecture of Intelligence, providing a rigorous mathematical foundation for deterministic computation over a continuously evolving Semantic World.

The papers that follow build upon this foundation by formalizing identity formation, semantic compilation, deterministic retrieval, semantic reasoning, and the computational mechanisms through which these mathematical principles are realized within the Andisheh Engine.

Appendix A — Mathematical Summary of the Architecture of Intelligence

This appendix summarizes the principal mathematical objects introduced throughout the Architecture of Intelligence. Subsequent papers use these definitions and notation without repeating their formal development.

> ***For semantic time t, $W_t = (I_t, E_t, R_t, A_t)$.***

- I_t: persistent Identities.
- E_t: immutable Events.
- R_t: Identity-Centric Persistent Relations.
- A_t: Semantic Assertions.

> ***Each Identity is represented as $i = (o_i, H_i, s_i)$.***

- o_i: origin Event.
- H_i: identity history.
- s_i: semantic state.

> ***Each Event is represented as $e = (P_e, \Phi_e, T_e, \alpha_e)$.***

- P_e: participating Identities and semantic roles.
- Φ_e: semantic Event structure.
- T_e: temporal information.
- α_e: Semantic Assertion.

> ***Each Persistent Relation is represented as $r = (i_a, \tau_r, i_\beta, H_r)$.***

- i_a and i_β: participating Identities.
- τ_r: relation type.
- H_r: persistent relation history.

> ***Each Semantic Assertion is represented as $\alpha = (p, m, \varepsilon, c)$.***

- p: polarity.
- m: modality.
- ε: epistemic status.
- c: confidence.

> ***$O : (W_t, x) \rightarrow W_{t+1}$.***

- W_t: current Semantic World.
- x: newly admitted semantic observation.
- W_{t+1}: resulting Semantic World after lawful admission.

The Observation Operator defines a single lawful semantic transition.

> ***$M : (W_t, x) \rightarrow W_{t+1}$.***

Intrinsic Memory denotes the class of computational systems that execute lawful observation transitions while preserving the continuity of the Semantic World according to the semantic invariants defined in this paper.

> $SC(W_t, W_{t+1}) \in [0,1]$.

- SC = 1 indicates perfect semantic continuity.
- SC = 0 indicates complete loss of semantic continuity.
- Values between 0 and 1 indicate partial preservation of semantic continuity.

Semantic continuity measures the extent to which the Semantic World preserves its persistent semantic structures and their lawful organization throughout successive world transitions.

> $\rho : Q \times W_t \rightarrow Y$.

- Q: semantic query space.
- Y: retrieval result space.

Semantic Retrieval is deterministic and non-mutative.

> *Identity Persistence:* $I_t \subseteq I_{t+1}$.

> ***Event Immutability: $E_t \subseteq E_{t+1}$.***

> ***History-Preserving World Extension: $W_t \preceq W_{t+1}$.***

> ***Non-Mutative Semantic Retrieval: Wbefore = Wafter.***

- Persistent Identity.
- Immutable Event.
- Identity-Centric Persistent Relations.
- Semantic Assertion Preservation.
- History-Preserving World Extension.
- Non-Mutative Semantic Retrieval.

Citation

Ketabchi, R. Mathematical Foundations of Intrinsic Memory. Cosinia Research Paper No.5 Version 1.0

← Previous Next →