Formal Theory of Deterministic Representational Validity

Vol. 1 — Foundation and Closed-Domain Formalization

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Abstract

This work defines Deterministic Representational Validity as the condition under which a representational state can be formally recognized as valid within a closed logical domain governed by invariant structural constraints. A representational state is valid if and only if it corresponds to a defined Authoritative State through a strictly deterministic equivalence relation evaluated under fixed, reproducible criteria.

Within this model, validity is determined by a binary outcome: a representational state either satisfies deterministic equivalence or it does not. Any structural divergence over the invariant parameter set is formally decidable, and until equivalence is established, the representational construct is considered non-existent with respect to recognized validity.

Validity does not depend on confirmation signals, transmission reliability, probabilistic inference, contextual interpretation, or heuristic judgment. It arises exclusively from structural correspondence evaluated under deterministic rules.

The model admits no intermediate validity states. Deterministic equivalence is a non-bypassable structural condition within the defined domain, and all recognized representational states are exhaustively determined by this binary conditioning structure.

This formulation is foundational in scope. It does not prescribe a specific architecture, technology, or sectoral application. Instead, it establishes the formal conditions under which representational validity may exist—or fail to exist—in any system operating under the deterministic constraints defined herein.

Keywords:
Deterministic Representational Validity; Transition Stabilization Axiom; Deterministic Equivalence; Binary Deterministic Constraint; Representational Non-Existence; Structural Non-Bypass Principle; Closed Logical Domain; State Asymmetry.

Technical Specifications:

Program Lineage: Deterministic Representational Validity Framework
Structural Basis: Transition Stabilization Axiom (TSA)
Formal Paradigm: Deterministic Structural State Conditioning
Core Formal Object: Binary Predicate $E(a, r)$ over set P
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Table of Contents

1 Scope and Domain Definition

This section establishes the formal boundaries within which Deterministic Representational Validity is defined and evaluated. It introduces the structural components of the Representational Domain, affirms its logical closure, and situates validity determination within a strictly non-empirical framework.

Collectively, these elements delineate the formal scope of the theory and define the closed structural environment in which representational validity becomes logically decidable under invariant conditions.

1.1 Definition of the Representational Domain

The Representational Domain is defined as a formally bounded and logically closed environment within which representational states may be generated, evaluated, and recognized as valid exclusively under the structural conditions specified by this theory.

This domain comprises:

1. A set $\mathcal{A}$ of Authoritative States, each uniquely identifiable and structurally defined within the domain.
2. A set $\mathcal{R}$ of Representational State Candidates derived from corresponding elements of $\mathcal{A}$.
3. A deterministic evaluation structure governing structural correspondence between elements of $\mathcal{A}$ and $\mathcal{R}$.
4. A binary validity predicate conditioning the existence of recognized representational validity.

Formally, the Representational Domain is defined as the structured tuple

$$\mathcal{D} := (\mathcal{A}, \mathcal{R}, P, E, f)$$

where $\mathcal{A}$ denotes the set of Authoritative States, $\mathcal{R}$ the set of Representational State Candidates, P the invariant parameter set governing evaluation, $E : \mathcal{A} \times \mathcal{R} \to \{0, 1\}$ the deterministic equivalence predicate, and $f : \mathcal{A} \to \mathcal{R}$ the deterministic derivation function mapping each Authoritative State to its corresponding representational candidate.

For any $a \in \mathcal{A}$, the Authoritative State is self-identical and invariant within the scope of evaluation. No contextual reinterpretation, post hoc modification, or external adjustment alters the identity of a for purposes of equivalence determination.

The Representational Domain is closed with respect to validity determination. No representational state may acquire recognized validity unless it is evaluated and conditioned strictly within the structural constraints defined herein.

The domain does not admit structural expansion, parameter augmentation, contextual reinterpretation, or validity redefinition without formal modification of its foundational constraints. Any such modification constitutes the definition of a new domain rather than an extension of the present one.

External processes, probabilistic assessments, operational confirmations, system-level acknowledgments, or interpretative judgments do not constitute elements of the Representational Domain unless they are explicitly formalized within the deterministic equivalence structure defined by this theory.

Accordingly, the Representational Domain defines the complete and closed logical space within which representational validity may either exist or fail to exist under invariant and formally specified conditions.

1.2 Closed Logical Model Assumption

The Closed Logical Model Assumption establishes that all conditions required for the determination of representational validity are fully contained within the defined Representational Domain.

Under this assumption:

1. The criteria governing Deterministic Equivalence are internally specified and invariant.
2. The Binary Validity Condition is exclusively determined by the equivalence predicate $E(a, r)$.
3. No external authority, contextual factor, probabilistic inference, or post hoc interpretation may alter, supplement, or override the validity determination once evaluated within the domain.

The model is therefore closed with respect to validity attribution. The existence or non-existence of a valid representational state is exclusively a consequence of internal structural conditions defined by this theory.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$E(a, r) \in \{0, 1\}$$

and its value is fully decidable under invariant evaluation rules.

This assumption does not preclude interaction with external systems. It establishes, however, that such interactions have no authority over representational validity unless formally incorporated into the deterministic structure of the model.

Accordingly, representational validity is fully decidable within the internal logic of the domain and admits no external override.

1.3 Non-Empirical Structural Foundation

The Non-Empirical Structural Foundation establishes that the validity conditions defined in this theory are grounded in formal structural constraints rather than empirical observation, statistical inference, contextual interpretation, or operational confirmation.

Within the Representational Domain:

1. Representational validity is determined exclusively by compliance with the equivalence predicate $E(a, r)$.
2. No appeal to user perception, behavioral response, probabilistic confidence, historical patterns, or external verification practices constitutes a sufficient basis for representational validity.
3. The truth value of $E(a, r)$ is independent of empirical confirmation and is entirely determined by structural conformity under invariant evaluation rules.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$E(a, r) \in \{0, 1\}$$

and its value is a consequence of structural parameter comparison within P, not of observed outcomes or experiential confirmation.

This foundation does not deny the relevance of empirical systems in broader operational contexts. It asserts, however, that representational validity — as defined herein — is a property of formal structural conditioning and not of empirical validation processes.

Accordingly, the model defines validity as a logically decidable property within a closed structural framework, independent of empirical validation mechanisms.

1.4 Domain Invariance and Non-Expansion

The Representational Domain defined in this theory is structurally closed and non-expansible under its stated constraints.

The invariant parameter set P, the deterministic equivalence predicate $E(a, r)$, and the Binary Validity Condition collectively exhaust the logical space of representational validity within the domain.

No additional parameters, predicates, categories of validity, evaluative dimensions, or intermediate truth states may be introduced without formal redefinition of the domain itself.

Any structural modification that alters the invariant parameter set P, the deterministic equivalence structure, or the binary evaluation range $E(a, r) \in \{0, 1\}$ constitutes a re-specification of the domain rather than an extension of it.

Accordingly, the domain admits neither incremental expansion nor contextual supplementation. Its structural boundaries are fully determined by its formal components and invariant evaluation rules.

2 Representational Validity as a Conditioned State

This section establishes Representational Validity as a structurally conditioned state within the defined domain. It specifies the necessary and sufficient conditions under which validity arises, articulates the binary deterministic constraint governing its evaluation, and excludes the possibility of intermediate validity states.

Collectively, these elements define validity not as an inferred or empirical attribute, but as a logically decidable condition emerging exclusively from deterministic structural compliance.

2.1 Definition of Representational Validity

Representational Validity denotes the formally recognized condition under which a representational state is structurally acknowledged as corresponding to a defined Authoritative State within the closed logical domain established by this theory.

Representational Validity exists if and only if the following conditions jointly hold:

1. A Representational State Candidate $r \in \mathcal{R}$ is derived from a corresponding Authoritative State $a \in \mathcal{A}$ through the deterministic transformation $f : \mathcal{A} \to \mathcal{R}$ under invariant constraints;
2. Deterministic Equivalence is established:

$$E(a, r) \iff \forall p \in P \ (a_p = r_p);$$

3. The Binary Validity Condition holds, i.e.,

$$E(a, r) = 1.$$

Representational Validity is therefore not a property inferred from successful transmission, system acknowledgment, temporal ordering, probabilistic confidence, or contextual interpretation. It is a structurally conditioned status emerging exclusively from compliance with deterministic transition constraints.

Absent joint satisfaction of these conditions, no representational state may be recognized as valid.

2.2 Necessary and Sufficient Conditions

The Necessary and Sufficient Conditions for Representational Validity are fully determined within the closed logical domain defined by this theory.

A representational state $r \in \mathcal{R}$ attains recognized validity with respect to $a \in \mathcal{A}$ if and only if all of the following conditions are jointly satisfied:

1. A uniquely identifiable Authoritative State $a \in \mathcal{A}$ exists within the domain.
2. A Representational State Candidate r is derived exclusively from a under the deterministic transformation $f : \mathcal{A} \to \mathcal{R}$ and invariant constraints.
3. Deterministic Equivalence holds:

$$E(a, r) \iff \forall p \in P \ (a_p = r_p).$$

Formally, these conditions are jointly necessary and jointly sufficient:

$$\text{Validity}(a, r) \iff E(a, r) = 1.$$

The absence of any single condition entails the failure of representational validity.

No empirical, contextual, probabilistic, heuristic, or interpretative factor may supplement, replace, or override these conditions within the closed domain.

Accordingly, Representational Validity is a logically decidable property entirely determined by structural compliance with the above constraints.

2.3 Binary Deterministic Constraint

The Binary Deterministic Constraint establishes that representational validity within the defined domain is governed exclusively by a discrete and non-gradual evaluation outcome.

Under this constraint:

1. The determination of validity is strictly binary.
2. For any given $a \in \mathcal{A}$ and corresponding $r \in \mathcal{R}$, the evaluation yields one of two mutually exclusive outcomes.
3. No intermediate, probabilistic, partial, contextual, confidence-based, or gradational states of validity are admitted.

Formally, the validity predicate satisfies:

$$E(a, r) \in \{0, 1\}$$

Structural determinism further requires invariance under identical inputs. For any $a_1, a_2 \in \mathcal{A}$,

$$a_1 = a_2 \implies f(a_1) = f(a_2)$$

and consequently, under invariant parameter evaluation,

$$E(a_1, f(a_1)) = E(a_2, f(a_2)).$$

Thus, identical Authoritative States evaluated under invariant conditions produce identical representational outcomes and identical validity determinations.

The validity predicate is therefore deterministic, reproducible, and non-stochastic. No probabilistic inference, heuristic approximation, temporal convergence, system confirmation signal, contextual adjustment, or interpretative assessment may influence or override the binary outcome.

Accordingly, representational validity is structurally confined to discrete determination under invariant evaluation rules.

2.4 Absence of Intermediate Valid States

The Absence of Intermediate Valid States establishes that no representational state may occupy a partially valid, conditionally valid, progressively valid, or probabilistically valid position within the model.

Within this structure:

1. A representational state either satisfies the necessary and sufficient conditions for validity or does not.
2. No transitional, pending, provisional, or confidence-based validity states are recognized.
3. Validity does not admit degrees, thresholds, tolerances, or convergence metrics.

Formally, since the validity predicate satisfies

$$E(a, r) \in \{0, 1\},$$

no intermediate logical value is admissible.

This absence is not a simplification of evaluation, but a structural consequence of the Binary Deterministic Constraint. Because validity is defined as a discrete logical predicate determined under invariant conditions, no intermediate logical state may exist between validity and non-validity.

Accordingly, the model excludes gradational or progressive stabilization. A representational state either attains *State V* or remains outside the domain of recognized validity.

3 Structural Discontinuity and State Asymmetry

This section establishes the structural conditions under which divergence arises between an Authoritative State and its corresponding Representational State Candidate. It defines Representational Discontinuity, introduces the formal expression of State Asymmetry (Δ), and specifies the logical consequences of non-equivalence.

Collectively, these elements delineate the structural boundary at which representational validity fails to obtain.

3.1 Definition of Representational Discontinuity

Representational Discontinuity denotes the structural condition in which a representational state $r \in \mathcal{R}$ is not formally synchronized with its corresponding Authoritative State $a \in \mathcal{A}$ under deterministic equivalence constraints.

A condition of Representational Discontinuity exists if and only if at least one of the following holds:

1. A representational state is externally instantiated without prior satisfaction of the necessary and sufficient conditions for Deterministic Representational Validity.
2. The transition $f : \mathcal{A} \to \mathcal{R}$ is not governed by invariant deterministic evaluation.
3. Structural asymmetry $\Delta(a, r)$ holds under invariant parameter comparison.

Representational Discontinuity does not refer to data absence, transmission delay, or operational latency in isolation. It refers strictly to structural divergence between a and r under the deterministic evaluation structure of the model.

Where such discontinuity exists, representational validity cannot be established under the formal conditions defined by this theory.

3.2 Formalization of State Asymmetry (Δ)

State Asymmetry (Δ) denotes the formally defined structural divergence between an Authoritative State and its corresponding Representational State Candidate within the model.

Let:

- $a \in \mathcal{A}$ represent an Authoritative State,
- $r \in \mathcal{R}$ represent a Representational State Candidate derived from a,
- P represent a finite, invariant, and domain-bounded set of critical parameters established prior to equivalence evaluation.

The transformation from a to r is defined as the deterministic function

$$f : \mathcal{A} \to \mathcal{R}$$

$$r = f(a)$$

where f is invariant, reproducible, and domain-constrained. For identical inputs $a_1 = a_2$, the function yields identical outputs $f(a_1) = f(a_2)$.

State Asymmetry is defined as

$$\Delta(a, r) \;:=\; \exists p \in P \; (a_p \neq r_p).$$

Asymmetry holds if and only if at least one parameter $p \in P$ differs under invariant comparison.

Equivalently,

$$\neg\Delta(a,r) \iff \forall p \in P\ (a_p = r_p).$$

Thus,

$$\neg\Delta(a,r) \iff E(a,r) = 1.$$

The parameter set P is fixed within the scope of evaluation and does not admit dynamic expansion, contextual substitution, adaptive refinement, or post-evaluative modification.

State Asymmetry therefore constitutes a formally decidable structural divergence defined strictly by non-identity under invariant parameter comparison. It is independent of perception, temporal persistence, operational latency, probabilistic confidence, or interpretative assessment.

If $\Delta(a,r)$ holds, structural correspondence is not established within the model.

3.3 Logical Consequences of Non-Equivalence

Non-equivalence between an Authoritative State $a \in \mathcal{A}$ and a Representational State Candidate $r \in \mathcal{R}$ entails structural consequences under invariant evaluation.

Given the formalization of State Asymmetry, if

$$\Delta(a,r)$$

then structural correspondence between a and r is not established under parameter-wise comparison.

Formally,

$$\Delta(a,r) \implies E(a,r) = 0.$$

Under this condition:

1. Representational Validity cannot be recognized.
2. The representational state lacks formal grounding under deterministic equivalence.
3. Any external instantiation of the representational state does not constitute a structurally validated correspondence to the Authoritative State.

Non-equivalence therefore results in the absence of valid representational recognition. This absence is a direct logical consequence of parameter divergence and not a matter of interpretative assessment or empirical uncertainty.

Accordingly, the model admits no structural pathway by which non-equivalent states may be treated as valid.

4 Deterministic Equivalence Principle

This section establishes the Deterministic Equivalence Principle as the governing structural rule of representational validity. It articulates equivalence as the decisive predicate upon which validity depends and defines the Stabilized Verification State obtained under invariant parameter conformity.

Collectively, these elements specify the formal mechanism through which representational stabilization is achieved and structural ambiguity is eliminated.

4.1 Formal Statement of the Principle

The Deterministic Equivalence Principle establishes that representational validity may arise only through structurally verified identity between an Authoritative State $a \in \mathcal{A}$ and its corresponding Representational State Candidate $r \in \mathcal{R}$ under invariant parameter evaluation.

Formally,

$$E(a, r) = 1 \iff \forall p \in P \ (a_p = r_p).$$

Equivalently,

$$E(a, r) \iff \forall p \in P \ (a_p = r_p).$$

where P denotes the invariant set of critical parameters governing equivalence.

The principle requires that:

1. Equivalence be established through deterministic evaluation procedures.
2. Identical Authoritative States produce identical representational outcomes under invariant conditions.
3. No probabilistic, heuristic, temporal, or interpretative substitution be admitted as a basis for validity.

Formally, structural determinism implies

$$a_1 = a_2 \implies f(a_1) = f(a_2),$$

and consequently

$$a_1 = a_2 \implies E(a_1, f(a_1)) = E(a_2, f(a_2)).$$

The Deterministic Equivalence Principle therefore functions as the governing structural rule eliminating ambiguity between authoritative state and representational state under invariant evaluation.

In the absence of full equivalence under the defined parameter set, representational validity cannot arise.

4.2 Equivalence as Predicate of Validity

Within the model, equivalence operates as the formal predicate governing the attribution of representational validity.

Let:

- $a \in \mathcal{A}$ denote an Authoritative State,
- $r \in \mathcal{R}$ denote a Representational State Candidate,
- P denote the invariant set of critical parameters.

The equivalence predicate is defined as

$$E(a, r) \iff \forall p \in P \ (a_p = r_p).$$

Formally,

$$E(a, r) \in \{0, 1\}.$$

Representational validity holds if and only if

$$E(a, r) = 1.$$

If $E(a, r) = 0$, representational validity cannot be recognized.

Equivalence thus functions not merely as a comparative operation, but as the decisive logical predicate upon which valid representation depends. No alternative predicate may substitute, override, approximate, or probabilistically infer this determination within the deterministic structure of the model.

4.3 Stabilized Verification State

A Stabilized Verification State denotes the formally recognized condition in which the equivalence predicate governing representational validity evaluates to 1 under invariant and reproducible constraints.

A Stabilized Verification State exists if and only if

$$E(a, r) = 1.$$

Equivalently,

$$\forall p \in P \ (a_p = r_p),$$

and therefore

$$\neg\Delta(a, r).$$

Under this condition:

1. Structural asymmetry $\Delta(a, r)$ does not hold.
2. The Binary Deterministic Constraint is satisfied.
3. Representational validity is formally established.

The Stabilized Verification State does not denote persistence, confirmation signals, or system acknowledgment. It denotes exclusively the logical condition resulting from deterministic equivalence evaluation under invariant rules.

If $E(a, r) = 0$, no Stabilized Verification State exists.

4.4 Authoritative State Identity Axiom

For any $a \in \mathcal{A}$, the Authoritative State is uniquely identifiable and structurally self-identical with respect to the invariant parameter set P.

Formally,

$$\forall a \in \mathcal{A}, \ \forall p \in P, \ \exists!\, a_p,$$

and the parameter value a_p remains invariant at the point of evaluation.

No Authoritative State may possess internal parameter ambiguity, multiplicity of values under identical identifiers, or contextual redefinition under invariant evaluation.

Equivalently, for any $a_1, a_2 \in \mathcal{A}$,

$$a_1 = a_2 \iff \forall p \in P\ (a_{1,p} = a_{2,p}).$$

The identity of a therefore constitutes a necessary structural precondition for deterministic equivalence. Without parameter-level identity invariance, equivalence evaluation cannot be well-defined.

5 Structural Deficit and Invalid States

This section establishes the structural conditions under which representational validity fails to obtain. It defines Stabilization Deficit, specifies the criteria characterizing invalid representation, and affirms that temporal persistence or operational continuity does not confer validity.

Collectively, these elements delineate the structural consequences of non-equivalence and define the conditions under which representational recognition remains unattained.

Together, these elements establish that invalid states are structurally determined by non-compliance with deterministic equivalence and remain unaffected by external exposure or system-level confirmation.

5.1 Definition of Stabilization Deficit

Stabilization Deficit denotes the structural condition in which representational validity fails to arise due to the absence of satisfied deterministic equivalence.

A condition of Stabilization Deficit exists if and only if at least one of the following holds:

1. $E(a, r) = 0$;
2. Equivalence evaluation is not performed under the invariant constraints defined by the domain;
3. The transition from $a \in \mathcal{A}$ to representational exposure occurs without conditioning by the equivalence predicate.

Formally, Stabilization Deficit holds whenever

$$E(a, r) = 0 \quad \text{or equivalently} \quad \Delta(a, r).$$

Under Stabilization Deficit, representational recognition lacks formal grounding. Any externally instantiated representational state under this condition does not satisfy the necessary and sufficient conditions for validity.

Stabilization Deficit therefore constitutes a structurally definable absence of representational stabilization. It is determined exclusively by failure of deterministic conditioning under invariant evaluation rules.

5.2 Conditions of Invalid Representation

An Invalid Representation denotes any representational state that fails to satisfy the necessary and sufficient conditions for Deterministic Representational Validity.

Formally, a representation $r \in \mathcal{R}$ with respect to $a \in \mathcal{A}$ is invalid if and only if

$$E(a, r) = 0.$$

Equivalently, Invalid Representation holds if at least one of the following conditions is satisfied:

1. Deterministic Equivalence is not established, i.e., $E(a, r) = 0$;
2. Structural asymmetry $\Delta(a, r)$ holds;
3. The Binary Deterministic Constraint is violated;
4. The transition from a to representational exposure occurs without conditioning by the equivalence predicate.

Under these conditions, the representational state lacks formal validity. External exposure, system acknowledgment, transmission success, contextual acceptance, or operational confirmation do not alter this status.

Invalid Representation therefore constitutes a structurally determined state defined exclusively by non-compliance with the formal constraints governing representational validity.

5.3 Persistence of Non-Validated States

Persistence of Non-Validated States denotes the structural condition in which a representational state remains externally instantiated or operationally active despite the absence of deterministic equivalence.

Formally, a non-validated state persists if and only if

1. $E(a, r) = 0 \quad \text{or equivalently} \quad \Delta(a, r)$ holds;
2. The representational state $r \in \mathcal{R}$ remains externally accessible, transmitted, stored, processed, or rendered.

Persistence does not alter the validity status of the representational state. The absence of deterministic equivalence remains decisive regardless of duration, repetition, replication, or operational confirmation.

Temporal continuation, system stability, or successful propagation do not constitute evidence of validity. Representational validity is exclusively determined by compliance with deterministic structural constraints.

6 Structural Irreducibility and Non-Bypass Principle

This section establishes deterministic equivalence as a structurally mandatory and irreducible condition for representational validity. It defines the topological non-circumventability of the equivalence predicate within the representational transition structure and specifies the structural consequences of its removal.

Collectively, these elements affirm that equivalence is not an auxiliary mechanism, but a constitutive component of the validity model whose absence results in structural indeterminacy.

Together, these elements affirm that representational validity cannot arise through alternative pathways, auxiliary mechanisms, or discretionary enforcement, but only through the invariant structural conditioning defined by this theory.

6.1 Mandatory Structural Conditioning

Mandatory Structural Conditioning establishes that the transition from an Authoritative State $a \in \mathcal{A}$ to externally recognized representation $r \in \mathcal{R}$ must be governed by deterministic equivalence as a non-optional structural requirement.

Formally, representational validity may arise only if

$$E(a, r) = 1.$$

Within this model:

1. Equivalence evaluation is not configurable, discretionary, or context-dependent.
2. Conditioning of representational exposure by the equivalence predicate is structurally required.
3. No representational state may attain recognized validity unless such conditioning has been satisfied.

Omission, deactivation, circumvention, or substitution of equivalence evaluation results in structural invalidity, i.e.,

$$E(a, r) = 0.$$

Deterministic equivalence therefore functions as a mandatory structural gate governing the transition between authoritative state and externally recognized representation.

6.2 Topological Non-Circumventability

Topological Non-Circumventability establishes that no alternative structural pathway exists by which representational validity may be recognized without prior satisfaction of deterministic equivalence.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$\text{Validity}(a, r) \Longrightarrow E(a, r) = 1.$$

Within this model:

1. The equivalence evaluation constitutes a mandatory structural node in the transition from authoritative state to externally recognized representation.
2. No parallel process, auxiliary channel, concurrent execution path, interface shortcut, or post hoc validation mechanism may substitute for this evaluation.
3. No alternate structural path exists by which a representational state may attain recognized validity.

This non-circumventability is not enforced by configuration or procedural constraint, but by the formal structure of the domain. If equivalence conditioning is bypassed, then

$$E(a, r) = 0,$$

and representational validity cannot arise.

Representational validity is therefore topologically constrained to a single structurally mandated transition pathway governed by deterministic equivalence.

6.3 Logical Collapse Under Predicate Removal

Logical Collapse Under Predicate Removal denotes the structural consequence that arises if the equivalence predicate $E(a, r)$ is removed, bypassed, or no longer enforced as a necessary condition for representational validity.

Formally, if representational validity is permitted without requiring

$$E(a, r) = 1,$$

then the following structural consequences obtain:

1. The Binary Deterministic Constraint cannot be maintained;
2. The necessary and sufficient conditions for validity cease to be logically decidable;
3. The distinction between valid and invalid representational states becomes undefined.

Under such condition, the model no longer admits a well-defined validity predicate. The mapping between authoritative state and recognized representation becomes structurally indeterminate.

Logical Collapse therefore establishes that $E(a, r)$ is a structurally indispensable component of the model. Its removal eliminates the definitional boundary between valid and non-valid states and renders the system internally inconsistent with respect to deterministic representational validity.

7 Formal Closure of the Deterministic Model

This section establishes the formal closure of the Deterministic Representational Validity model. It specifies that binary deterministic conditioning exhaustively governs validity determination, affirms the logical completeness of the validity domain, and maintains internal consistency under invariant structural constraints.

Collectively, these elements confirm that representational validity is fully decidable, non-gradual, and structurally confined to deterministic equivalence under invariant conditions.

7.1 Exhaustiveness of Binary Conditioning

Exhaustiveness of Binary Conditioning establishes that the determination of representational validity is fully and exclusively governed by the binary evaluation of deterministic equivalence.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$E(a, r) \in \{0, 1\}.$$

Within this model:

1. Every representational state presented for recognition is subject to evaluation under the equivalence predicate $E(a, r)$;
2. The outcome of this evaluation exhaustively determines the validity status of the representational state;
3. No additional logical category, auxiliary qualifier, or supplementary evaluative dimension exists beyond the binary outcome of this predicate.

Accordingly, the domain admits exactly two mutually exclusive and collectively exhaustive conditions:

$$E(a, r) = 1 \quad \text{or} \quad E(a, r) = 0.$$

No residual logical space exists for partially conditioned, contextually mitigated, probabilistically weighted, or temporally deferred validity states.

Binary deterministic evaluation is therefore exhaustive with respect to representational recognition.

7.2 Completeness of the Validity Domain

Completeness of the Validity Domain establishes that all logically admissible states of representational recognition are fully determined by the structural conditions specified in this theory.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$, the validity status is completely determined by

$$E(a, r) \in \{0, 1\}.$$

Within the model:

1. The criteria governing representational validity are internally sufficient for decision.
2. The binary validity predicate exhaustively partitions representational states into two mutually exclusive and collectively exhaustive classes.
3. No intermediate, graded, contextual, or probabilistic categories of validity exist.
4. No additional structural classes of representational recognition are admissible beyond those formally defined.

Completeness therefore implies logical decidability: for every r associated with a, the validity status is uniquely determined under invariant evaluation rules.

No external supplementation, interpretative expansion, probabilistic refinement, contextual qualification, or secondary confirmation mechanism is required or admissible to resolve validity.

Any alteration of the invariant parameter set P, the equivalence predicate $E(a, r)$, or the binary range $\{0, 1\}$ constitutes the definition of a new logical domain.

Accordingly, the Validity Domain is logically complete with respect to its stated scope: every admitted representational state is structurally and decisively classifiable.

7.3 Final Consistency Statement

The Final Consistency Statement affirms that the definitions, principles, constraints, and structural conditions established in this theory constitute a non-contradictory and internally coherent logical system.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$:

$$E(a, r) \in \{0, 1\},$$

and representational validity holds if and only if

$$E(a, r) = 1.$$

Within this model:

1. Representational Validity is determined exclusively by deterministic equivalence under invariant parameter evaluation;
2. The Binary Deterministic Constraint exhaustively governs validity attribution;
3. No intermediate validity states exist;
4. No structural pathway permits validity recognition outside the formally specified conditions.

No definition contradicts the necessary and sufficient conditions governing validity. No principle permits recognition of validity in the absence of deterministic equivalence. No structural rule introduces indeterminacy.

Accordingly, the theory constitutes a logically consistent and decidable system in which representational validity is structurally conditioned and internally non-contradictory.

8 Terminology and Formal Definitions

This section establishes the formal terminology governing the Deterministic Representational Validity model. Each term is introduced as a structural component of the closed logical domain and is defined through explicit and invariant conditions. The definitions provided herein are not interpretative or descriptive; they function as formal constructs whose meaning is fully determined by the internal logic of the theory.

Collectively, these definitions constitute the foundational vocabulary required for precise interpretation, derivation, and structural application within the model.

Unless explicitly incorporated into the deterministic equivalence structure, probabilistic, heuristic, inferential, contextual, temporal, or interpretative mechanisms remain structurally excluded from validity determination.

8.1 Deterministic Representational Validity

Deterministic Representational Validity denotes the formally grounded condition under which a representational state is structurally recognized as valid through invariant deterministic evaluation.

Formally, for $a \in \mathcal{A}$ and $r \in \mathcal{R}$, Deterministic Representational Validity holds if and only if

$$E(a, r) = 1.$$

Equivalently,

$$\forall p \in P \; (a_p = r_p).$$

Deterministic Representational Validity is therefore not an empirical, probabilistic, contextual, or interpretative status. It is a structurally conditioned logical state arising exclusively from parameter-wise identity under deterministic transformation.

Validity exists only where representational recognition is conditioned by deterministic equivalence. In the absence of such conditioning, no representational state may attain recognized validity.

8.2 Transition Stabilization Axiom (TSA)

The Transition Stabilization Axiom (TSA) establishes the foundational structural principle governing the emergence of representational validity.

The TSA states that a representational state may attain recognized validity if and only if its transition from $a \in \mathcal{A}$ to $r \in \mathcal{R}$ is conditioned by deterministic equivalence.

Formally,

$$\text{Validity}(a, r) \Longleftrightarrow E(a, r) = 1.$$

The TSA defines the necessary structural gate in the transition between authoritative state and externally recognized representation. No representational state may attain validity independently of this conditioning.

All structural consequences of the model — including *State* V, Binary Validity Condition, Representational Non-Existence, and the Structural Non-Bypass Principle — derive from and presuppose the TSA as their formal foundation.

8.3 Perceptive Vacuum (VP)

Perceptive Vacuum (VP) denotes the structural condition in which no representational state satisfies Deterministic Representational Validity at the point of representational interaction.

Formally, VP holds if and only if

$$E(a, r) = 0.$$

Equivalently,

$$\Delta(a, r).$$

Under VP, a representational construct may be externally exposed, transmitted, processed, or observed; however, it does not attain *State* V.

Perceptive Vacuum therefore designates the structural absence of valid representational stabilization. It denotes absence of recognized validity, not absence of data or operational presence.

Resolution of VP requires satisfaction of the Transition Stabilization Axiom through deterministic equivalence.

8.4 Perceptual Stabilization Deficit (PSD)

Perceptual Stabilization Deficit (PSD) denotes the structural condition in which the transition from $a \in \mathcal{A}$ to $r \in \mathcal{R}$ is not governed by the mandatory deterministic equivalence requirement.

PSD holds if and only if at least one of the following conditions obtains:

1. The equivalence predicate is not structurally enforced as a necessary condition for representational recognition;
2. The transition from authoritative state to representational exposure occurs without conditioning by $E(a, r)$;
3. The equivalence evaluation is optional, bypassable, or not topologically mandatory.

Under PSD, representational recognition is not grounded in deterministic equivalence. Consequently, validity becomes structurally indeterminate with respect to a and r.

PSD therefore denotes failure of the stabilization mechanism itself, not merely absence of equivalence in a particular instance.

Resolution of PSD requires full compliance with the Transition Stabilization Axiom and restoration of mandatory equivalence conditioning.

8.5 State V

State V denotes the formally stabilized condition under which a representational state satisfies Deterministic Representational Validity.

Formally, a representational state $r \in \mathcal{R}$ with respect to $a \in \mathcal{A}$ is in *State V* if and only if

$$E(a, r) = 1.$$

Equivalently,

$$\forall p \in P \ (a_p = r_p).$$

State V constitutes the stabilized outcome of the Transition Stabilization Axiom. It represents the structurally conditioned existence of recognized validity under invariant deterministic evaluation.

If $E(a, r) = 0$, the representational state does not attain *State V* and remains outside the class of valid representations.

8.6 Deterministic Equivalence

Deterministic Equivalence denotes the formally defined condition under which an Authoritative State $a \in \mathcal{A}$ and a Representational State Candidate $r \in \mathcal{R}$ are structurally identical with respect to the invariant parameter set P.

Formally, Deterministic Equivalence holds if and only if

$$E(a, r) \iff \forall p \in P \ (a_p = r_p).$$

Equivalence is established exclusively through invariant deterministic evaluation over the fixed parameter set P. For identical inputs, evaluation yields identical outcomes.

Any deviation within P — including omission, alteration, enrichment, or non-derivable modification — constitutes non-equivalence, i.e.,

$$E(a, r) = 0.$$

Deterministic Equivalence therefore functions as the structural mechanism upon which validity determination is grounded.

8.7 Binary Validity Condition

The Binary Validity Condition establishes that representational validity is determined exclusively by the binary evaluation of the equivalence predicate.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$E(a, r) \in \{0, 1\}.$$

Validity holds if and only if

$$E(a, r) = 1,$$

and fails if and only if

$$E(a, r) = 0.$$

No intermediate, graded, probabilistic, contextual, or temporally progressive validity states are admissible.

The Binary Validity Condition therefore exhaustively partitions representational states into mutually exclusive and collectively exhaustive classes.

8.8 Representational Non-Existence

Representational Non-Existence denotes the formal condition in which a representational state does not attain recognized validity.

Formally, Representational Non-Existence holds if and only if

$$E(a, r) = 0.$$

Equivalently,

$$\Delta(a, r).$$

Representational Non-Existence does not denote absence of data, computational output, transmission, or external exposure. It denotes the structural absence of validity recognition under deterministic equivalence.

Until $E(a, r) = 1$, a representational construct remains outside the class of valid representations and therefore does not exist as a valid representational state within the model.

8.9 Structural Non-Bypass Principle

The Structural Non-Bypass Principle establishes that no representational state may attain recognized validity unless it has undergone full conditioning by deterministic equivalence.

Formally, for any $a \in \mathcal{A}$ and $r \in \mathcal{R}$,

$$\text{Validity}(a, r) \implies E(a, r) = 1.$$

No alternative pathway, parallel evaluation mechanism, auxiliary process, contextual substitution, or structural omission may substitute for or circumvent the equivalence predicate.

If equivalence conditioning is bypassed, then

$$E(a, r) = 0,$$

and representational validity cannot arise.

The Structural Non-Bypass Principle therefore enforces the topological irreducibility of deterministic equivalence within the representational transition structure.

Final Structural Statement

The formal system established herein constitutes a structurally closed and logically decidable model of representational validity.

All predicates, transformation rules, binary constraints, and stabilization conditions are fully determined by deterministic equivalence under invariant parameter evaluation.

For any $a \in \mathcal{A}$ and $r \in \mathcal{R}$, validity is uniquely and exhaustively determined by

$$E(a, r) \in \{0, 1\}.$$

No auxiliary premise, external supplementation, contextual reinterpretation, or parallel structural mechanism may alter or extend this determination without redefining the system itself.

Deterministic Representational Validity therefore stands as a formally complete, irreducible, and internally consistent binary conditioning structure governing the structural existence or non-existence of recognized representational states.