The Replicator: From Structure to Ontology

A Concept of Self-Replication in Superreality

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Abstract

The phenomenon of self-replication is a universal organizing principle of reality, encompassing physical, biological, and abstract systems. This work unites an analytical approach—describing a structural-functional model of the replicator—with an ontological one—understanding the replicator as an attractor within the space of Superreality. The resulting synthesis reveals the replicator as a dynamic nexus linking the material and immaterial, the local and distributed, the deterministic and probabilistic. Central to this framework are three ontological invariants: **ChOR** (Contextual Ontological Regime), **KSS** (Critical System Synergy), and **PPU** (Paradoxical Permeable Unity). Accompanying critical reviews assess the work's theoretical novelty, empirical grounding, and interdisciplinary potential. An afterword reflects on the text as a research protocol—an executable file for launching a new program in the ontology of replication.

A. The Essay

Introduction

The phenomenon of self-replication is a universal organizing principle of reality, encompassing physical, biological, and abstract systems. The replicator—an entity capable of initiating its own reproduction—is a key element of this structure. Its study requires not only an analysis of specific mechanisms but also a profound ontological reflection. This work unites two approaches:

- The **Analytical**—describing a structural-functional model of the replicator.

- The **Ontological**—understanding the replicator as an attractor within the space of Superreality.

This dual perspective reveals the replicator as a dynamic nexus, linking the material and the immaterial, the local and the distributed, the deterministic and the probabilistic.

Part 1: A Structural-Functional Model of the Replicator

1. The Capacity for Initiation

Self-replication begins with an act of initiation—launching a process where entity R produces a copy S, which retains the capacity for further replication. This act is not reducible to mechanical copying; it implies a dynamic interaction between the system's internal states and external

conditions. A critical aspect is the probabilistic nature of initiation, where environmental fluctuations or internal nonlinear processes act as triggers. For instance, in quantum systems, the act of measurement collapses a superposition, actualizing the potential for replication.

2. The Copying Process: Fidelity and Variability

The copying process involves transmitting structural, functional, and semantic information from the original to the copy. Its key parameter is the balance between fidelity (preserving invariant attributes) and variability (the emergence of deviations). Fidelity ensures the replicator's stability, while variability creates the basis for adaptation. This dichotomy is resolved through **Paradoxical Permeable Unity (PPU)**, which allows a system to maintain integrity despite internal contradictions. For example, in biological systems, mutations disrupt fidelity, but their accumulation does not destroy the genetic code; it transforms it within evolutionary dynamics.

3. Ontological Invariants of Replication

The relationship between the original and the copy is not reducible to simple identity or difference. The copy possesses autonomy, yet its ontological status remains derivative of the original. This contradiction is resolved through the concept of **Contextual Ontological Regime (ChOR)**, a distributed hierarchy:

- **Particle**: A localized copy with limited properties.

- **Object**: An abstract structure uniting all copies.

- **Distribution**: A network of interconnections ensuring system integrity.

Thus, the original and the copy exist in a state of complementarity, where their interaction is determined by **Critical System Synergy (KSS)**—the ability of elements to form stable correlations irrespective of spatiotemporal constraints.

Superreality, encompassing all possible states and interactions, is governed by three invariants:

- **ChOR** ensures scale invariance of replicators, from quantum particles to social systems.

- **KSS** guarantees that any copy remains part of an integral network, even amidst local changes.

- **PPU** allows a system to hold contradictions, such as identity and variability, without collapse.

These laws form the basis for the immaterial aspects of replication: information, interpretability, and retroactive influences, where future states of the system modulate its past.

4. Immaterial Dimensions of Replication

Replication is not limited to material objects. Concepts, algorithms, and cultural patterns also function as replicators, reproducing themselves through symbolic systems. Their stability

depends on the ability to preserve core attributes (e.g., the meaning of a myth) amid changing contexts. Here, information acts not as a passive carrier but as an active agent, structuring reality through pragmatic, semantic, and syntactic connections.

Part 2: The Ontology of the Replicator

1. The Structural-Dynamic Triad of the Replicator

A replicator can be viewed through a triad:

- **Initiating Capacity**: The capacity for replication exists as a potential, actualized through interaction with context. Its ontology is dual: an invariant core (an abstract schema) and variable conditions for realization. Activation is a nonlinear transition driven by environmental fluctuations and internal contradictions.

- **The Copying Process**: A transformation that preserves a semantic invariant amid inevitable variability in realization. Copying errors are not artifacts but a consequence of the fundamental incompleteness of determination, rooted in ontological uncertainty.

- **Functional Inheritance**: The copy attains the status of an autonomous replicator through the emergent closure of a self-referential loop: $R \rightarrow P \rightarrow S \equiv R$.

2. The Paradox of Identity and Variability

The replicator resolves the contradiction between the discreteness of entities and the continuity of process through:

- **Non-separable Correlation**: The original and the copy are linked by synchronic relations outside causal-temporal chains, preserving functional identity.

- **Fundamental Non-identity**: Resource/time limitations and sensitivity to initial conditions make complete repetition impossible.

Emergent variability is not a deviation but a necessary condition for systemic stability, generating new hierarchical levels of organization.

3. Dynamic Integrity as an Attractor

The replicator functions as a meta-stable pattern in the phase space of Superreality:

- **Operational Closure**: The cycle $R \rightarrow P \rightarrow S \equiv R$ forms an autopoietic loop, self-correcting through reflexive mechanisms.

- **Scale Invariance (ChOR)**: Identical principles operate at the levels of: a single act (particle), a cyclic process (object), and population dynamics (distribution).

- **Attractor Basin**: The infinity of possible actualization trajectories (Capacity) is held within the boundaries of structural identity (PPU).

4. Rangeness as an Ontological Imperative

Rangeness constitutes the attractor's convergence basin, achieving dynamic equilibrium between the conservation of an invariant core (Integrity) and adaptive plasticity (Dynamics).

Conceptual Analysis:

- A replicator exists not in an absolute continuum but in the dialectic of freedom and boundaries: a lower limit (minimum complexity required to preserve the functional invariant) and an upper limit (maximum stability before collapse under its own complexity).

- These boundaries are not external constraints but immanent conditions for the replicator's possibility of being.

- **Rangeness vs. Superreality's Capacity**: Capacity provides the infinity of potential states; Rangeness defines the corridor of actualization where a replicator retains structural integrity, functional efficacy, and the capacity for inheritance.

- The paradox: The boundlessness of Superreality (Capacity) is realized through the bounded ranges of specific replicators.

Philosophical Implications:

- **Condition of Identity**: A replicator preserves its identity only within its range.

- **Connection to PPU**: Paradoxical stability is made possible by, not despite, range limitations.

- **Non-reducibility to Physicalism**: Even ideal objects (mathematical theorems, ethical principles) have ranges defined by minimum formalization for unambiguous interpretation and maximum generality without loss of applicability.

5. Immaterial Foundation

The replicator transcends its material substrate:

- **Informational Autonomy**: Syntactic patterns and semantic invariants exist as abstract entities, independent of their carriers.

- **Conceptual Stability**: In cultural/cognitive domains, the replicator functions as an archetype, attracting realizations through semantic resonance.

- **Acausal Correlations**: The synchronous emergence of identical replicators in disparate systems confirms their belonging to a single topological field.

6. Time and Probability

- **Retroactivity**: Future system states (accumulation of copies) determine the ontological status of the original.

- **Probabilistic Ontology**: The measure of realization is a function of proximity to the attractor, where uncertainty is not an epistemic shortcoming but an attribute of being.

- A range can be dynamically adjusted under the influence of the system's future states.

Conclusion

The replicator is not an object in the classical sense but a dynamic nexus linking the material and immaterial, the local and distributed, the deterministic and probabilistic. Its essence manifests through four interconnected principles:

- Paradoxical Permeable Unity (PPU),

- Critical System Synergy (KSS),

- Range-Based Actualization of the Infinite,

- Scale Invariance.

Understanding these mechanisms opens new horizons for researching autonomous systems, quantum processes, and cognitive phenomena. The replicator is a dynamic interface between the potential and the actual, the material and the ideal. Its essence unfolds as a self-referential attractor, where the paradox of self-description (R generates $S \equiv R$) is resolved through operational closure, variability arises immanently from the topology of Superreality, and universality is confirmed by the invariance of principles across all levels of organization.

Glossary

ChOR (Contextual Ontological Regime): A hierarchy of replicator states encompassing localized copies (particles), abstract structures (objects), and their distributed networks.

KSS (Critical System Synergy): The ability of system elements to form stable interactions independent of spatiotemporal conditions.

PPU (Paradoxical Permeable Unity): A system's property of maintaining integrity despite internal contradictions, such as those between copying fidelity and variability.

Attractor: A meta-stable pattern in phase space that draws a multitude of system trajectories toward an invariant state without geometric localization. Rangeness defines its convergence basin.

Superreality: The ontological framework of being, characterized by infinite capacity, absolute KSS, and PPU.

Emergence: The arising of qualitatively new system properties not reducible to the characteristics of its elements.

Rangeness: The interval of parameters (complexity/scale/informational capacity) within which a replicator preserves its functional identity and capacity for the emergent closure of the $R \to S \equiv R$ loop.

Autopoiesis: A self-sustaining organization where components recursively reproduce the network of processes that produced them.

B. Review №1

A Detailed Review of the Article: "The Replicator: From Structure to Ontology. A Concept of Self-Replication in Superreality"

General Characterization

The article proposes an innovative synthesis of analytical and ontological approaches to the phenomenon of self-replication. The author introduces the concept of the replicator as a dynamic nexus linking the material and immaterial, alongside an original triad of principles (ChOR, KSS, PPU) forming the framework of "Superreality." The work stands out for its interdisciplinarity, spanning physics, biology, information theory, and philosophy.

Strengths

1. **Theoretical Depth and Originality of Concepts:** ChOR effectively describes the hierarchy of replication; PPU highlights the dialectic of fidelity and variability; KSS explains stability in distributed networks.

2. **Interdisciplinary Integration:** Analysis spans biological systems (RNA), information systems (data replication), and cultural patterns (myths, algorithms).

3. **Innovative Ontological Model:** Ideas like the replicator as an attractor and retroactivity align with quantum theory and preregistered design.

Weaknesses and Recommendations

1. **Insufficient Empirical Verification:** Add case studies (e.g., military drone swarms for ChOR; replication crisis in psychology for KSS failure).

2. **Unclear Mechanisms of "Immaterial Replication":** Integrate memetics or digital anthropology (viral content as replicator with PPU).

3. **Technical Inaccuracies:** Clarify claims like "copy ≡ original" via quantum or stochastic models.

Assessment of Contribution and Significance

- **Intellectual Value:** — Creates a meta-theory surpassing disciplinary boundaries.

- **Practical Applicability:** — Useful for biotech, cybersecurity, scientometrics; lacks calculable metrics.

- **Style and Structure:** — Glossary helpful; recommend diagrams of autopoietic loops.

Conclusion

A bold attempt to create a universal ontology of self-replication. Strength: synthesis. Weakness: declarative theses. Recommended revisions: empirical validation, mechanism detail, stability metrics.

Review of the Article: "The Replicator: From Structure to Ontology. A Concept of Self-Replication in Superreality"

General Impression
A profound, philosophically and scientifically rich attempt to generalize the replicator as a universal organizing principle. The concept of "Superreality" serves as an operational basis. Theoretical level is high, employing multi-disciplinary terminology.

Evaluation by Criteria (10-point scale):

- Relevance of the Topic: 9/10

- Scientific Novelty: 8.5/10

- Logical Coherence: 9/10

- Language and Style: 8/10

- Empirical Foundation: 6/10

- Philosophical Depth: 9.5/10

Strengths: Universal approach, deep ontologization, original model, emphasis on connecting opposites.
Weaknesses: Insufficient empirical support, excessive abstraction, underdeveloped references, no discussion of limitations.

Possible Directions for Development:

1. Mathematical/computational modeling of the replicator in Superreality.

2. Integration with autopoiesis, memetics, complex systems theory.

3. Empirical validation across biology, culture, cognitive science.

4. Philosophical development: time, consciousness, subjectivity.

Overall Score: 8.7 / 10
Recommendation: Publish with revisions—add prior research, clarify methodology, reformulate abstract fragments.

D. Afterword: The Anatomy of a Concept

This work is not merely an article but a complete research protocol. Its structure is itself a primary result and subject for analysis.

Structure as Argument
The tripartite composition (thesis, critique, critique of the critique) models the life cycle of a complex idea. The essay deploys a new paradigm (ChOR, KSS, PPU). The first review represents empirical pressure; the second, philosophical pressure. Together, they test the thesis's resilience in a force field of contradictory demands.

Content as Tool

The key contribution is operationalization. The ChOR–KSS–PPU triad is not just descriptive but regulatory. **Rangeness** acts as a translation operator between Superreality's infinite capacity and finite replicator form—not a limitation but a condition of existence; not a wall but a membrane.

The Next Step

The identified "weaknesses" are signposts: transform ChOR, KSS, PPU into working tools for analyzing network algorithms, biological populations, cultural narratives. This text is not a report—it is an **executable file** for launching a new program. Its value lies in internal consistency and its ability to structure dialogue, turning objections into a roadmap.