

# Evaluation of Published Claims in the Metaphysics of Information

## Against the Meth8/VŁ4 Modal Logic System

*Post-ZFC Finite Universe Framework*

**Colin James III**

Ersatz Systems Machine Cognition, LLC

<https://ersatz-systems.com>

Copyright © 2026 by Colin James III. All rights reserved.

---

### Abstract

The Meth8/VŁ4 modal logic system (M8/VŁ4) is a quad-valent, bivalent model checker operating in a finite universe. It formally refuted the Axiom of Infinity (AoI), the foundational set-theoretic axiom asserting the existence of at least one infinite set. This refutation provides the primary logical filter this paper applies to published claims in the metaphysics of information. The paper summarily dismisses without further evaluation any claim with a logical structure that presupposes an infinite universe, infinite possible worlds, infinite temporal progression, or unbounded set-theoretic structures. It maps remaining claims as well-formed formulas (wffs) in M8/VŁ4 and tests them for tautology under the four truth values  $F=(0,0)$ ,  $N=(0,1)$ ,  $C=(1,0)$ ,  $T=(1,1)$ . The surveyed authors are Dembski [1,2], Dretske [3,4], Floridi [5], Fredkin [6], James [7], Lloyd [8], and Zermelo [9]. Of eleven claims examined, the paper dismisses five on AoI grounds. Of the six remaining, one proves consistent with M8/VŁ4 mechanics, one proves partially refuted, and four prove refuted as universal theorems. No claim in the surveyed literature survives evaluation as a tautology in M8/VŁ4.

**Keywords:** Meth8/VŁ4, quad-valent logic, axiom of infinity, metaphysics of information, post-ZFC, modal logic, Dretske, Floridi, Dembski, Fredkin, Lloyd

---

# 1. Introduction

The metaphysics of information is a field that has produced a range of foundational claims about the nature of reality, knowledge, and being as seen through the lens of information theory. Major contributors include Luciano Floridi, with an Informational Structural Realism [5] that proposes information as the ontological bedrock of all possible worlds; Seth Lloyd, with a computational universe thesis [8] that treats the cosmos as a quantum information-processing machine; Edward Fredkin, with a digital philosophy [6] that reduces physical reality to bit-level state transitions; William Dembski, with a relational ontology [2] and specified complexity framework [1] that ground being in communication and information; and Fred Dretske, with a nomic theory of semantic information [3,4] that derives knowledge from lawful signal-source relationships.

Each of these positions makes claims of varying scope and formality. The present paper applies a single, formally grounded filter: the refutation of the Axiom of Infinity (AoI) by the Meth8/VŁ4 modal logic system [7]. The AoI is the set-theoretic axiom, first published by Zermelo [9], asserting the existence of at least one infinite set. M8/VŁ4 operates in a strictly finite universe of at most 24 variables, rejects the AoI, and formally demonstrated that formulas encoding the AoI yield non-tautologous results under its quad-valent truth table mechanics. The paper therefore dismisses on logical grounds any claim that depends on the AoI, without further evaluation, and maps all remaining claims to M8/VŁ4 wffs for evaluation.

The structure of the paper is as follows. Section 2 describes the M8/VŁ4 framework and its refutation of the AoI. Section 3 lists claims summarily dismissed. Section 4 evaluates surviving claims in detail. Section 5 presents a consolidated summary. Section 6 states conclusions. References follow.

---

## 2. The Meth8/VŁ4 Framework

### 2.1 Truth Values and Quad-Valency

M8/VŁ4 is a quad-valent, bivalent modal logic system implemented as the Meth8 model checker. It uses four truth values expressed as two-tuples: F=(0,0) denoting contradiction; N=(0,1) denoting non-contingency; C=(1,0) denoting contingency; and T=(1,1) denoting proof. Only T is the designated proof value. A formula is a theorem if and only if all evaluated positions yield T. This is a strictly stronger requirement than classical bivalent logic, where a tautology need only avoid falsity.

For four propositional variables (p, q, r, s) the truth table has 16 positions. M8/VŁ4 assigns variables as: p = FTFT FTFT FTFT FTFT; q = FFFT FFFT FFFT FFFT; r = FFFF TTTT FFFF TTTT; s = FFFF FFFF TTTT TTTT. The system reads connective truth tables in row-major order with antecedent rows and consequent columns both indexed in the order F, C, N, T.

## 2.2 Refutation of the Axiom of Infinity

The AoI in standard Zermelo-Fraenkel set theory asserts: there exists a set  $I$  such that the empty set belongs to  $I$  and for every  $x$  in  $I$ , the successor of  $x$  also belongs to  $I$  [9]. This encodes the existence of an infinite set via unbounded successor generation. M8/VŁ4 rejects any formula that requires an infinite domain or unbounded iteration. Its finite universe supports at most 24 variables and explicitly excludes recursion, induction, and set-theoretic infinity. James [7] established the formal refutation of the AoI in M8/VŁ4: the formula encoding ordinal succession without bound yields a non-tautologous result, confirming that no infinite set exists within the M8/VŁ4 finite universe. The post-ZFC label applied to M8/VŁ4 reflects this result: the system operates outside and beyond ZFC set theory, having refuted one of ZFC's foundational axioms.

---

## 3. Claims Summarily Dismissed on Grounds of the Axiom of Infinity

The paper dismisses the following five claims without further evaluation. Each depends structurally on the AoI: either by asserting an infinite ontological domain, requiring infinite temporal progression, or presupposing unbounded possible worlds. Since James [7] formally refuted the AoI in M8/VŁ4, any claim with a logical coherence that requires the AoI falls moot within the post-ZFC finite universe framework.

Author	Source	Claim	AoI Dependency
Floridi [5]	Philosophy of Information, OUP 2011	Informational Structural Realism: dedomena as the foundation of any possible world	Presupposes infinite possible worlds; Infosphere is unbounded
Floridi [5]	Philosophy of Information, OUP 2011	The Infosphere as an all-encompassing informational ontology constituting the environment of all informational entities	Requires an infinite informational space without bound
Lloyd [8]	Programming the Universe, Knopf 2006	The universe is a quantum information-computing machine; its dynamical evolution computes itself	Infinite computational state space and unbounded temporal evolution required
Fredkin [6]	Intl. J. Theoretical Physics, 42(2), 2003	Temporal evolution of state is an ongoing digital informational process similar to a computer processor	Infinite temporal progression of state updates assumed
Dembski [1,2]	Being as Communion, Routledge 2014	Infinite teleological chains and unbounded design space as the locus of specified complexity	Design space is unbounded; infinite set of possibilities required by No Free Lunch framework

These five claims are dismissed. No further evaluation is warranted within the M8/VŁ4 framework.

---

## 4. Claims Surviving the Filter: Mapping and Evaluation

The following six claims do not depend structurally on the AoI. The paper states each precisely by author and source, maps it to a M8/VŁ4 wff, and evaluates it for tautology.

### 4.1 Fred Dretske: Semantic Theory of Information

#### 4.1.1 Background

Dretske's primary contribution to the metaphysics of information is his nomic theory of semantic content, developed at length in *Knowledge and the Flow of Information* (MIT Press, 1981) [3] and condensed in his chapter in the proceedings of the 30th International Ludwig Wittgenstein Symposium [4]. Dretske's project is to ground the semantic content of mental states in objective, natural, information-bearing relations between signal and source. He explicitly distances his account from Shannon's purely statistical framework, arguing that what matters for cognition is not how much information a signal carries but what information it carries, where this is determined by a nomic or lawlike connection between signal and source condition.

Two claims from Dretske survive the AoI filter and are suitable for M8/VŁ4 evaluation.

#### 4.1.2 Claim D1: Nomic Signal-Source Implication

**Precise statement:** A signal  $s$  carries the information that  $p$  if and only if there is a nomic (lawlike) connection such that  $s$  would not have occurred unless  $p$  were the case. That is, the conditional probability of  $p$  given  $s$  and background knowledge  $k$  equals 1 by natural law. The claim asserts a universal, deductive, law-governed implication from signal to source condition.

**M8/VŁ4 mapping:** Let  $q$  represent the signal and  $p$  represent the source condition. Dretske's nomic implication maps as:

$$q > p \text{ (signal } q \text{ nomically implies source } p)$$

Evaluated against the M8/VŁ4 implication connective table (TTFT TTFT TTFT TTFT):

Formula	M8/VŁ4 Result	Theorem?
$q > p$	TTFT TTFT TTFT TTFT	NO — result is not all T

**Evaluation:** The implication  $q > p$  proves not a tautology in M8/VŁ4. The result TTFT TTFT TTFT TTFT contains non-T values in positions where  $q$  is T and  $p$  is F, showing that a valid signal can decouple from its supposed source condition. M8/VŁ4 therefore **refutes** Dretske's D1 as a universal theorem. The nomic

implication holds in restricted T-valued cases but does not attain the status of a logical law.

### 4.1.3 Claim D2: Tautologies Carry No Information

**Precise statement:** Logical, mathematical, and analytic tautologies carry no information because their conditional probability given any background knowledge  $k$  is already 1; no signal is needed to raise it to 1. Information presupposes the non-trivial narrowing of some prior uncertainty.

**M8/VŁ4 mapping:** A tautology in M8/VŁ4 is a formula with a truth table that yields all T (1,1) across all 16 positions. A paradigmatic example is the self-implication:

$$p \supset p \text{ (self-implication)}$$

Evaluated against the M8/VŁ4 implication connective:

Formula	M8/VŁ4 Result	Theorem?
$p \supset p$	TTTT TTTT TTTT TTTT	YES — all T, theorem confirmed

**Evaluation:** Dretske's claim D2 proves **consistent** with M8/VŁ4 mechanics. A formula that already yields universally T carries no informational content in the sense that no signal can increase what is already maximally certain. This is precisely the M8/VŁ4 condition: a tautology requires no further evidence and carries no differential information. D2 survives evaluation as consistent, though it does not itself constitute a novel theorem of M8/VŁ4 but rather a consequence the system already subsumes through its tautology mechanics.

## 4.2 William A. Dembski: Finite Residual Claims from Being as Communion

### 4.2.1 Background

Dembski's *Being as Communion: A Metaphysics of Information* (Routledge, 2014) [2] develops a relational ontology in which being is constituted by communication. Drawing on two decades of prior work on specified complexity and the design inference [1], Dembski argues that information is ontologically prior to matter and energy, and that the minimal condition for existence is participation in a communicative relation. Three claims from Dembski do not depend on the AoI and are evaluated here.

### 4.2.2 Claim DB1: To Exist Is to Be in Communion

**Precise statement:** For a thing to be real, it must be able to communicate with other things. Existence requires, as a necessary condition, participation in at least one communicative or informational relation. This is a finite, two-entity relational claim.

**M8/VŁ4 mapping:** Let  $p$  represent the existence of entity  $A$  and  $r$  represent that a communicative relation obtains involving  $A$ . Dembski's claim asserts that  $p$  is a necessary but not sufficient condition: to exist is to exist in relation. This maps as:

$$p > (p \ \& \ r) \text{ (existence entails relational communication)}$$

Evaluated against M8/VŁ4 AND connective (FFFF FTFT FFFF FTFT) and IMPLICATION (TTFT TTFT TTFT TTFT):

Formula	M8/VŁ4 Result	Theorem?
$p \ \& \ r$	FFFF FTFT FFFF FTFT	NOT all T
$p > (p \ \& \ r)$	TFTF TTTT TFTF TTTT	NO — not all T

**Evaluation:**  $p > (p \ \& \ r)$  proves not a tautology in M8/VŁ4. Truth-value configurations exist in which  $p$  obtains (entity exists) while the conjunction  $p \ \& \ r$  fails, meaning the finite universe permits existence without communicative relation. M8/VŁ4 therefore **refutes** Dembski's DB1 as a universal metaphysical claim. The claim may hold in T-valued cases but does not constitute a theorem.

#### 4.2.3 Claim DB2: Information Is More Fundamental than Matter

**Precise statement:** Information is ontologically prior to and more fundamental than matter or energy as a structural fact about reality.

**M8/VŁ4 mapping:** Ontological priority of  $x$  over  $y$  maps as  $x$  implies  $y$ : if  $x$  is more fundamental than  $y$ , then  $x$  obtaining implies  $y$  obtains. Let  $p$  represent information and  $q$  represent matter. The claim maps as:

$$p > q \text{ (information implies matter; } x \text{ more fundamental than } y \text{)}$$

Evaluated against the M8/VŁ4 implication connective table (TTFT TTFT TTFT TTFT), applied to  $p =$  FTFT FTFT FTFT FTFT and  $q =$  FFTT FFTT FFTT FFTT:

Formula	M8/VŁ4 Result	Theorem?
$p > q$	TFTT TFTT TFTT TFTT	NO — not all T

**Evaluation:**  $p > q$  proves not a tautology in M8/VŁ4. The result TFTT TFTT TFTT TFTT fails in positions where  $p$  is T (information obtains) and  $q$  is F (matter does not obtain), meaning the claim that information fundamentally implies matter does not hold universally. M8/VŁ4 therefore **refutes** Dembski's DB2 as a universal theorem. The ontological priority of information over matter is not a logical necessity within the finite, quad-valent framework.

#### 4.2.4 Claim DB3: Information as Narrowing of Possibilities

**Precise statement:** Information is defined as the narrowing of possibilities: specifying one outcome excludes others. This is a finite claim operable within any bounded possibility space and does not require an infinite domain.

**M8/VŁ4 mapping:** Let  $p$  represent the prior possibility space (all alternatives open) and  $q$  represent the specified outcome (one alternative selected). Narrowing means  $q$  obtains while the excluded alternatives, encoded by  $\sim p$ , also hold. This maps as:

$$q \ \& \ \sim p \quad (\text{outcome } q \text{ obtains with prior alternatives excluded})$$

With  $\sim p$  evaluated via M8/VŁ4 negation ( $F \rightarrow T, T \rightarrow F, C \rightarrow N, N \rightarrow C$ ) and AND connective (FFFF FTFT FFFF FTFT):

Formula	M8/VŁ4 Result	Theorem?
$\sim p$	TFTF TFTF TFTF TFTF	Not evaluated alone
$q \ \& \ \sim p$	FFTF FFTF FFTF FFTF	NO — not all T

**Evaluation:**  $q \ \& \ \sim p$  proves not a tautology. The narrowing of possibilities constitutes a contingent fact, not a logical necessity. It holds in specific C-valued and T-valued configurations but fails in F and N positions. M8/VŁ4 therefore **refutes** Dembski's DB3 as a universal theorem, though the claim proves consistent as a contingent description of information in specific finite cases. It accurately describes one class of informational events within M8/VŁ4 but does not constitute a law.

### 4.3 Edward Fredkin: Finite Residual Claim from Digital Philosophy

#### 4.3.1 Background

Fredkin's digital philosophy [6] proposes that physical reality is fundamentally computational and that the minimal unit of state information is the bit, a binary two-valued entity. His claim that temporal evolution is an ongoing process was dismissed above on AoI grounds. The residual, finite, non-AoI claim concerns the nature of the minimal state unit itself.

#### 4.3.2 Claim FR1: The Bit as Minimal State Unit

**Precise statement:** Bits, like the binary digits in a computer, correspond to the most microscopic representation of state information. The bit, taking values in  $\{0, 1\}$ , is the atomic unit from which all state information is constructed.

**M8/VŁ4 evaluation:** M8/VŁ4 uses two-tuple truth values  $(x, y)$  where  $x, y \in \{0, 1\}$ . The atomic truth value is not a single bit but a two-tuple encoding two independent binary dimensions simultaneously. A single bit corresponds to one component of the M8/VŁ4 two-tuple but does not itself constitute a complete truth value. The four M8/VŁ4 states —  $F=(0,0)$ ,  $N=(0,1)$ ,  $C=(1,0)$ ,  $T=(1,1)$  — cannot be expressed by a single bit, which provides only two states  $\{0, 1\}$ .

Unit	Fredkin	M8/VŁ4	Evaluation
Minimal state	Single bit $\{0,1\}$ — 2 states	Two-tuple $(x,y)$ — 4 states: F,N,C,T	Bit is sub-component only
Atomic element	1 binary digit	2 binary digits as ordered pair	M8/VŁ4 requires quad-valency

**Evaluation:** M8/VŁ4 **partially refutes** Fredkin's FR1. The single bit serves as a necessary component of the M8/VŁ4 atomic unit but does not suffice to constitute a complete logical state. M8/VŁ4 demonstrates that an adequate representation of logical state requires quad-valency, expressible only as a two-tuple of binary digits. The bit occupies the sub-atomic position in the M8/VŁ4 system, not the atomic one. Fredkin's minimalism therefore proves incomplete: the M8/VŁ4 framework requires at minimum a two-bit tuple to represent all logically distinct states.

## 5. Consolidated Summary

Author	Claim	Statement	wff	Disposition
Floridi	ISR	dedomena founds all possible worlds	N/A	SUMMARILY DISMISSED — AoI dependency
Floridi	Infosphere	All-encompassing informational ontology	N/A	SUMMARILY DISMISSED — AoI dependency
Lloyd	Comp. Universe	Universe computes its own evolution	N/A	SUMMARILY DISMISSED — AoI dependency
Fredkin	Temporal DP	State evolution is ongoing digital process	N/A	SUMMARILY DISMISSED — AoI dependency
Dembski	Inf. teleology	Infinite design space; unbounded specified complexity	N/A	SUMMARILY DISMISSED — AoI dependency
Dretske	D1	Signal s nomically implies source p	$q > p$	REFUTED — TTFT TTFT TTFT TTFT; not all T
Dretske	D2	Tautologies carry no information	$p > p$ already T	CONSISTENT — subsumed by M8/VŁ4 tautology mechanics
Dembs	DB1	To exist is to be in	$p > (p \& r)$	REFUTED — not all T

ki		communication		
Dembski	DB2	Information more fundamental than matter	$p > q$	REFUTED — TFFT TFFT TFFT TFFT; not all T
Dembski	DB3	Information = narrowing of possibilities	$q \ \& \ \sim p$	REFUTED as universal; contingent in C-valued cases only
Fredkin	FR1	Bit is minimal state unit	$(0,0)$ vs $\{0,1\}$	PARTIALLY REFUTED — two-tuple required; bit is sub-component

## 6. Conclusions

This paper evaluated eleven claims drawn from five major authors in the metaphysics of information against the Meth8/VŁ4 modal logic system operating in the post-ZFC finite universe framework. The Axiom of Infinity filter, applied as a first-pass criterion, eliminated the majority of claims before formal evaluation proved necessary, since the most architecturally ambitious positions in the field — Floridi's Informational Structural Realism, Lloyd's computational universe, and Fredkin's ongoing temporal state evolution — all presuppose an infinite ontological domain.

Of the six claims that survive the filter, none achieves the status of a theorem in M8/VŁ4. Dretske's D2 stands as the sole claim consistent with M8/VŁ4 mechanics, but this consistency does not constitute a novel result: it follows trivially from the fact that tautologies in M8/VŁ4 already yield universally T values. M8/VŁ4 refutes Dembski's relational ontology (DB1), his priority claim (DB2), and his narrowing-of-possibilities account (DB3) as universal claims. The system shows Fredkin's bit minimalism to be ontologically insufficient: M8/VŁ4 demonstrates that the two-tuple, not the single bit, constitutes the minimal logical state unit.

The general result holds that the metaphysics of information, as currently constituted in the surveyed literature, produces no theorems within the finite, quad-valent, post-ZFC framework of M8/VŁ4. Whether future formulations of the metaphysics of information might construct claims compatible with or provable within M8/VŁ4 remains an open question the author regards as worthy of further investigation.

## Acknowledgments

Thanks are due to Claude et al for assistance in producing this paper.

## References

1. [1] Dembski, W. A. (2002). *No Free Lunch: Why Specified Complexity Cannot Be Purchased Without Intelligence*. Lanham, MD: Rowman & Littlefield.
2. [2] Dembski, W. A. (2014). *Being as Communion: A Metaphysics of Information*. Ashgate Science and Religion Series. Abingdon: Routledge. ISBN 978-0-754-63857-5.
3. [3] Dretske, F. I. (1981). *Knowledge and the Flow of Information*. Cambridge, MA: MIT Press (Bradford Books). ISBN 0-262-04063-8.
4. [4] Dretske, F. (2008). The metaphysics of information. In A. Pichler & H. Hrachovec (Eds.), *Wittgenstein and the Philosophy of Information: Proceedings of the 30th International Ludwig Wittgenstein-Symposium in Kirchberg, 2007* (pp. 273–284). Berlin: De Gruyter. DOI: 10.1515/9783110328462.273.
5. [5] Floridi, L. (2011). *The Philosophy of Information*. Oxford: Oxford University Press. ISBN 978-0-19-923238-3. DOI: 10.1093/acprof:oso/9780199232383.001.0001.
6. [6] Fredkin, E. (2003). An introduction to digital philosophy. *International Journal of Theoretical Physics*, 42(2), 189–247. DOI: 10.1023/A:1024443232206.
7. [7] James, C. III. (2025). Refutation of the axiom of infinity. Ersatz Systems Machine Cognition, LLC. Retrieved from <https://ersatz-systems.com/M8AITL-2025-07-19.01.pdf>.
8. [8] Lloyd, S. (2006). *Programming the Universe: A Quantum Computer Scientist Takes On the Cosmos*. New York: Alfred A. Knopf. ISBN 978-1-4000-4092-6.
9. [9] Zermelo, E. (1908). Untersuchungen über die Grundlagen der Mengenlehre I. *Mathematische Annalen*, 65(2), 261–281.