Human Linguistics as a Mathematical Equation: Definition, Assertible Universes, and Law-Level Concept-Objects

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Abstract

This sequence makes no claim to have discovered "the first law" of anything: naming a finding—"first," a person's name, any descriptor—and asking what it *is* fixes a frame-relative cut that asserts nothing about the world and can be driven *toward* certainty 1 but never *to* it. What carries problem-solving power is not that noun but an operational identity used as a *method*; a law, in plain terms, is a *perspective and a choice*—a cut. This paper supplies the linguistic foundation for the cut-quotient sequence and begins where the sequence should: with *what a law is*. The minimal unit of language is not the word, symbol, or proposition, but the *cut* together with its quotient placement. A definition selects a cut on a pre-conceptual domain and places the resulting class inside a language quotient, producing a concept-object; a *law* is then a stable concept-object with generative consequence closure — a distinction that persists as one object and keeps generating consequences. The slogan "concept equals non-concept" is generative, not object-level, equality: $C \neq C^{\perp}$ locally, but $[C]_{\mathrm{Cut}} = [C^{\perp}]_{\mathrm{Cut}}$ because both sides are generated by the same cut. The paper adds a precise assertible-universe theorem: for a proof-apt language $\mathcal{L}$, the universe-as-assertible-totality is the cut-closure quotient $\mathcal{U}_{\mathcal{L}}^{\mathrm{ass}} = U/{\equiv_{\mathcal{D}_{\mathcal{L}}}}$ generated by the admissible cuts of that language, so the universe of science, mathematics, or philosophy is a maximal domain-making quotient object, not an unstructured given. The paper proves that non-trivial concepts induce opposition, definitions produce quotient-placed object-states, assertible universes are cut-closure domains, and law-level status is stability plus consequence closure. Turning the lens on the word "law" itself, law-hood is a stable opposition-unity—an identity we wield as an operational *method* (a checkable criterion for law-level status), never as a metaphysical definition of some discovered thing. We read that result honestly from the start: it is the shared *form* of laws, an analytic fact about the vocabulary, and as a form it asserts nothing about any particular world. The first law is in this sense the silent origin — having no content of its own, it is the frame against which particular laws acquire one; the meaning is never in the law but in the cut. The sequence's value is accordingly instrumental, not metaphysical: the cuts themselves, their triage, their honest provenance, and the cross-domain transfer they make visible.

1 Main claim

What this paper does not claim. It does not announce the discovery of a law. To ask what a law *is*, and to answer with a name or a noun-definition, is to choose a perspective—a cut—and a cut asserts nothing on its own; under any modern standard such a claim could at best approach certainty 1 without reaching it. The author therefore permanently sets aside the rhetoric of "we found the first law." What the sequence does carry is an *operational identity used as a method*: the law-level criterion below decides status for any object it is applied to, and it earns its keep the way an equation does—by solving problems—not the way a definition of a word does.

A language is not merely a stock of signs attached to pre-existing entities. A proof-apt language is a system of cuts, quotient placements, and consequence-generating concept-objects. The paper uses the following sequence:

$$\text{expression} \to \text{definition} \to \text{cut} \to \text{quotient placement} \to \text{concept-object} \to \text{law-level closure.}$$

The same sequence also clarifies the mathematical status of "the universe" as an object of discourse. An assertible universe is not treated here as an inaccessible noumenal totality. It is treated as the maximal quotient-domain generated by the admissible cuts of a proof-apt language. In short:

$$\text{assertible universe} = \text{cut-closure quotient domain.}$$

This is a mathematical claim about scientific, mathematical, and philosophical assertibility, not a loose metaphor.

2 Concepts as cuts

Let U be a pre-linguistic or pre-conceptual domain. A binary concept-cut is a non-constant map

$$D_C : U \to \{0, 1\}.$$

It induces

$$C = D_C^{-1}(1), \qquad C^{\perp} = D_C^{-1}(0),$$

and hence

$$U = C \cup C^{\perp}, \qquad C \cap C^{\perp} = \varnothing.$$

Lemma 1 (Cut-opposition lemma)**.** *Every non-trivial proof-apt concept-cut induces a formal opposition.*

Proof. The inverse images of the two values of D_C are disjoint and jointly exhaustive on the relevant domain. Since D_C is non-constant, both sides are non-vacuous relative to the concept-domain. Thus the same act that generates C generates the counter-domain $C^{\perp}$. □

Remark 1 (Generative equality)*.* The expression "concept = non-concept" is false as $C = C^{\perp}$. The correct reading is

$$\boxed{C \neq C^{\perp} \quad \text{but} \quad [C]_{\text{Cut}} = [C^{\perp}]_{\text{Cut}}.}$$

Equivalently,

$$\boxed{\text{Gen}(C) = \text{Gen}(C^{\perp}) = D_C.}$$

The two regions are locally distinct and generatively unified. This is the linguistic form of opposition-unity.

Natural language often uses graded rather than binary cuts. A graded cut is

$$D_C : U \to [0, 1], \qquad D_{C^{\perp}}(x) = 1 - D_C(x).$$

The binary case is the sharp boundary model. The graded case preserves the same generator: a concept creates a contrast profile even when the boundary is fuzzy.

3 Assertible universes as cut-closure domains

Let $\mathcal{L}$ be a proof-apt language over the pre-conceptual domain U. Let

$$\mathcal{D}_{\mathcal{L}} = \{D_i : U \to V_i\}_{i \in I}$$

be the family of admissible observable cuts, predicates, measurements, or formal distinctions available in $\mathcal{L}$. Define an equivalence relation

$$x \equiv_{\mathcal{D}_{\mathcal{L}}} y \quad \Longleftrightarrow \quad D_i(x) = D_i(y) \text{ for all } i \in I.$$

The quotient

$$\boxed{\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}} := U/{\equiv_{\mathcal{D}_{\mathcal{L}}}}}$$

is called the *assertible universe* of $\mathcal{L}$. Equivalently, it is the cut-closure domain

$$\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}} = \mathrm{CutCl}_{\mathcal{L}}(U),$$

where $\mathrm{CutCl}_{\mathcal{L}}$ means closure under all admissible distinctions that can be expressed, tested, formalized, or used by $\mathcal{L}$.

Theorem 1 (Assertible-universe theorem)**.** *If a universe is scientifically, mathematically, or philosophically assertible in a proof-apt language $\mathcal{L}$, then it appears as a quotient object inside $\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}}$. Consequently, it is governed by the cut structure of $\mathcal{L}$: every non-trivial assertion about it induces a counter-domain at the level of admissible cuts.*

Proof. To be assertible in $\mathcal{L}$ is to be expressible through the admissible distinctions of $\mathcal{L}$. These distinctions form $\mathcal{D}_{\mathcal{L}}$. Two pre-conceptual states that agree on all such distinctions cannot be separated by $\mathcal{L}$, so the assertible domain is the quotient $U/{\equiv_{\mathcal{D}_{\mathcal{L}}}}$. Any non-trivial assertion about this domain is induced by some further cut or family of cuts, and the cut-opposition lemma applies. □

Proposition 1 (Universal property of the assertible universe)**.** *The quotient $\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}} = U/{\equiv_{\mathcal{D}_{\mathcal{L}}}}$ is the coarsest separation of U that resolves every admissible cut. Precisely, let $f : U \to W$ be any map that is constant on $\equiv_{\mathcal{D}_{\mathcal{L}}}$-classes. Then f factors uniquely through the quotient projection $\pi_{\mathcal{L}} : U \to \mathcal{U}^{\mathrm{ass}}_{\mathcal{L}}$: there is a unique $\bar{f} : \mathcal{U}^{\mathrm{ass}}_{\mathcal{L}} \to W$ with $f = \bar{f} \circ \pi_{\mathcal{L}}$. In particular every admissible cut D_i factors through $\pi_{\mathcal{L}}$, and $\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}}$ is terminal among $\mathcal{L}$-definable separations of U.*

Proof. Each admissible D_i is by construction constant on $\equiv_{\mathcal{D}_{\mathcal{L}}}$-classes, so it factors through $\pi_{\mathcal{L}}$. For a general class-constant f, set $\bar{f}([x]) = f(x)$; this is well defined precisely because f is constant on classes, and unique because $\pi_{\mathcal{L}}$ is surjective. Hence any separation of U definable from admissible distinctions is a coarsening of $\mathcal{U}^{\mathrm{ass}}_{\mathcal{L}}$, which is therefore the maximal admissible separation. □

Remark 2 (Universe as a domain-making operation). The theorem does not identify the physical universe with a single predicate. It identifies the universe-as-assertible-totality with the quotient closure of all admissible predicates in a proof-apt language. Thus "universe" is not merely the largest object in the language; it is the maximal domain in which objects become distinguishable for that language.

4 Definition as quotient placement

A cut induces an equivalence relation

$$x \sim_C y \quad \Longleftrightarrow \quad D_C(x) = D_C(y),$$

and hence a quotient map

$$\pi_C : U \to U/{\sim_C}.$$

A definition is not only a sentence. It is a placement operation that turns an expression into an object of a language quotient.

Definition 1 (Definition state)**.** *Let e be an expression, D_e its admissible cut or observable map, and $Q_t = U/{\sim_t}$ the language quotient available at stage t. A definition state is*

$$\mathrm{Def}_t(e) = O_e(t) := \pi_t\big(D_e^{-1}(1)\big) \in Q_t,$$

for the binary case, with the evident label-wise generalization for multi-valued maps.

The counter-state is

$$O_e^{\perp}(t) := \pi_t\big(D_e^{-1}(0)\big).$$

Thus a definition creates an object-state and a counter-object-state in the same quotient placement.

Proposition 2 (Definition-object theorem)**.** *Every non-trivial definition in a proof-apt language generates a quotient-placed concept-object and a quotient-placed counter-object.*

Proof. A non-trivial definition supplies a cut D_e. By the cut-opposition lemma, D_e generates both $D_e^{-1}(1)$ and $D_e^{-1}(0)$. Applying the available quotient map π_t places both regions inside Q_t. These images are the concept-object and counter-object generated by the definition. $\square$

5 Laws as stable concept-objects

The sequence uses a precise definition of a law.

Definition 2 (Consequence operator)**.** *Let Q_t be a language, mathematical, scientific, or model-theoretic quotient space. A consequence operator is a monotone map*

$$\Gamma_t : \mathcal{P}(Q_t) \to \mathcal{P}(Q_t),$$

where $\Gamma_t(A)$ contains the definitions, predictions, inferences, applications, counter-tests, and derived objects generated from A at stage t.

Define the consequence closure

$$\Gamma_t^*(O) = \bigcup_{n \geq 0} \Gamma_t^n(O), \qquad \Gamma_t^0(O) = O.$$

Stability under admissible re-description, written Stable_H, must be made precise rather than left implicit, since it is the cross-stage condition on which law-level status depends.

Definition 3 (Horizon stability)**.** *Let $O_e(t) \in Q_t$ be the definition state of an expression e at stage t, for t in a horizon H. The family $\{O_e(t)\}_{t\in H}$ is* stable over H, *written* $\mathrm{Stable}_H(O_e)$, *if for all $t, t' \in H$ there exists a quotient isomorphism $\varphi_{t,t'} : Q_t \to Q_{t'}$, induced by admissible re-description, such that*

$$\varphi_{t,t'}\big(O_e(t)\big) = O_e(t').$$

Equivalently, the quotient class of e retains its extension under every admissible re-description across H.

Remark 3 (Stability and the moving quotient)*.* This makes Stable_H a precise, falsifiable condition rather than an implicit assumption. It is exactly the condition whose *failure* is tracked by the moving quotient $Q_t = S/{\equiv_t}$ of the persistence paper of this sequence: a law-level object is one whose quotient class does not drift across H, whereas a moving-quotient carrier is one whose class changes extension and must be regenerated. The stable case and the moving case are two regimes of the same quotient structure.

Definition 4 (Law-level concept-object)**.** *A concept-object $O_t \in Q_t$ is law-level over a horizon H if it is stable under admissible re-description and has non-trivial generative consequence closure:*

$$\boxed{\mathrm{Law}_H(O_t) \quad\Longleftrightarrow\quad \mathrm{Stable}_H(O_t)\ \wedge\ \Gamma_t^*(O_t)\ \textit{is non-trivial and reusable.}}$$

In words:

$$\boxed{\textit{Law} = \textit{stable concept-object with generative consequence closure.}}$$

This definition separates three things that are often conflated: a name, a concept-object, and a law. A name may fail to stabilize—and naming alone, whatever word we choose ("first," an eponym, any descriptor), settles nothing: it fixes a perspective without earning content. A stable concept may still fail to generate consequences. A law-level object must do both; this is why the boxed line above is read as an *operational criterion*—a method an object either passes or fails—rather than as a verbal definition of what a law "really is."

Theorem 2 (Law formation theorem)**.** *If a definition state $O_e(t)$ remains stable under admissible re-description over a horizon H and its consequence closure is non-trivial and reusable, then $O_e(t)$ is a law-level concept-object.*

Proof. This follows directly from the definition of Law_H. The content is not that every definition is a law, but that law-level status is a structural property of a quotient-placed object: stability plus generative consequence closure. □

Remark 4 (Law is itself a cut)*.* The predicate Law_H is itself a non-trivial cut $D_{\mathrm{Law}} : U \to \{0, 1\}$, separating law-level objects from non-law-level ones (an unstable or sterile concept lies in the counter-domain). By the cut-opposition lemma it generates its own opposition, unified at its generator, $\mathrm{Gen}(\mathrm{Law}) = \mathrm{Gen}(\mathrm{Law}^{\perp}) = D_{\mathrm{Law}}$. Unfolding the definition, a law-level object is then exactly a stable, generatively-closed opposition-unity — in one line, Law = a stable, self-regenerating opposition-unity. The central paper states this as a representation theorem and notes that law-hood, satisfying its own definition, is a fixed point of the opposition-unity generator.

6 No-terminus proof as asymptotic convergence

Because every proof-expression is itself a definition, every finite proof generates a new object-state and a counter-state. A proof horizon therefore moves whenever the counter-state remains refinable. The proof form appropriate to the first-law program is asymptotic rather than terminal.

Let $q_n \in [0,1]$ denote proof confidence after n admissible verifications, embeddings, or counterexample searches. In the idealized monotone case,

$$q_{n+1} = q_n + \alpha_n(1 - q_n), \qquad 0 < \alpha_n < 1.$$

Thus

$$q_n = 1 - (1 - q_0) \prod_{k=0}^{n-1} (1 - \alpha_k).$$

If $\sum_k \alpha_k = \infty$, then $q_n \to 1$, while $q_n < 1$ for every finite n.

Theorem 3 (Asymptotic proof form)**.** *In a recursively refinable proof-language, a first-law thesis may be mathematically confirmed by convergence to* 1 *without any finite concept/fact expression closing the process at* 1*.*

Proof. The convergence claim follows from the product formula. The non-terminal claim follows because each finite proof is a definition state, hence a quotient-placed concept-object, and therefore generates a counter-object under the same cut. If the language remains refinable, the counter-object creates a new admissible proof horizon. □

7 Proof status

The results above occupy three levels: native theorems (standard or directly proved), model-internal theorems (proved under the definitions introduced here), and first-law embeddings (structural interpretations). The following table records the status and a confidence estimate for each, so that proven and programmatic content are not conflated.

Result	Status	Confidence
Non-trivial cut induces opposition (cut-opposition lemma)	native theorem	0.99
$C \neq C^{\perp}$ at object level	set-theoretic fact	1.00
$[C]_{\mathrm{Cut}} = [C^{\perp}]_{\mathrm{Cut}}$ at cut-origin level	definitional quotient theorem	0.96
Definition state $\mathrm{Def}_t(e) = \pi_t(D_e^{-1}(1))$	model-internal theorem	0.96
Horizon stability Stable_H (this paper)	model-internal definition	new
Law = stable concept-object with generative closure	structural definition + theorem	0.93
Assertible universe as cut-closure quotient (universal property)	model-internal theorem	0.91
Asymptotic proof update $q_n \to 1$ under $\sum \alpha_n = \infty$	elementary convergence	0.99
Opposition-unity as no-terminus generative first law	first-law embedding (global thesis)	0.84

8 Role in the paper sequence

This paper supplies the base language for the remaining papers:

$$\text{cut} \to \text{quotient placement} \to \text{concept-object} \to \text{law-level closure.}$$

It also supplies the domain equation

$$\mathcal{U}_{\mathcal{L}}^{\mathrm{ass}} = U/{\equiv_{\mathcal{D}_{\mathcal{L}}}},$$

which lets P2 state the universe-as-assertible-totality corollary without collapsing it into an ordinary object claim. P1 applies the framework to action and meaning. P2 states the first-law representation theorem. P3 develops moving quotient persistence. P4 turns the construction into evolving quotient networks. P5 synthesizes the sequence and fixes the strong-proof standard; the companion confidence note (C0) supplies the asymptotic confidence-interval estimator on which that standard rests.

9 Conclusion

Human language can be modeled as a cut-quotient machine. Definitions create quotient-placed concept-objects. The assertible universe of a proof-apt language is its cut-closure quotient domain. Law-level objects are stable concept-objects with generative consequence closure. This gives a precise linguistic foundation for the first-law claim without requiring a terminal concept/fact proof. None of this announces a discovered law; it supplies a *method*—an operational criterion for law-level status that any object can be put to—and locates a law where it honestly sits: in the perspective one chooses and the cut one makes, never in the name.

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