Our Infinite Reality — Logical Framework vs Implications (Release Candidate)

> Goal: finalize the **logical core** and clearly separate it from **implications** and **interpretations**.

−1) Preformal Commitments (beneath math)

> **Plain English:** These are the philosophical bones your math sits on. They motivate what we formalize, but they're not proofs.

- **P-1 Infinite Vast & Divisible.** Reality has no final size or smallest unit; it is refinable without end.
- **P-2 Co-Emergence of Opposites.** Every named quality is defined with its contrast.
- **P-4 Infinite Gradient with Paradoxical Center.** Opposites present as an infinite gradient whose "center" is a **limit**, not a reachable point.
- **P-5 Scale-Invariant Paradox.** Any paradox a structure holds, it holds at **all scales**.
- **Emergence Motif.** Zero → Two → Three → Ten-Thousand (void → polarity → rotation/field → forms).

Provenance (narrative): distilled from prior essays, dialogues, and notes in your *Our Infinite Reality* archive (Laozi conversations; NotebookLM dumps). These steer which invariances we formalize (ratio-truths, projection views, recursion via turning).

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0) Scope & Layering (the claim ladder)

> **Plain English:** Four levels: Tier-0 are the rules; Tier-1 is what follows; Tier-2 are structured guesses; Tier-3 are meanings/applications. Keep them apart so proof isn't mistaken for poetry.

Tier 0 — Primitives & Axioms (foundational; proof-obligation bearing)

- Core definitions, symmetry assumptions, and axioms specifying objects/transformations. Must be minimal and internally consistent.

Tier 1 — Theorems / Propositions (derivable consequences)

- Results that follow from Tier-0 under stated conditions, with proof or proof-sketch.

Tier 2 — Conjectures (structured but unproved claims)

- Precise, testable claims likely under Tier-0/1 but needing proof or data.

Tier 3 — Interpretations & Implications (cross-domain readings)

- Mappings into physics/biology/cognition/culture/TTC. **Not** the logic core; cite upstream claims.

Tagging & traceability. One **primary** tag per item: [T0]/[T1]/[T2]/[T3]. Dependencies explicit; promotion/demotion follows rules in §0.

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1) Tier-0: Primitives & Axioms (Logical Core)

> **Plain English:** These are the rules of the game and the pieces on the board. If this part wobbles, everything above it does.

1.1 Symmetry & Invariance Frame [T0]

> **Plain English:** A statement is **structurally accurate** if it stays true when you zoom or change units. Extra digits only sharpen description.

- **Similarity group S^+:** positive rescalings on relevant variables (unit/size/sampling changes).
- **Constant-accuracy statement:** a **dimensionless** relation invariant under S^+.
- **Precision:** resolution of representation/measurement (digits, error bars).
- **CAVP:** Accuracy ≡ invariance under S^+; Precision ≡ tunable resolution.

Declaration rule. Any "structural" claim must state its invariance group (at least S^+) and show invariance.

1.2 Recursive Structural Model (RSM) primitives [T0]

> **Plain English:** A formal landscape with two extremes, a balance line, and a swirl that keeps things from collapsing or flying apart.

Let (M_n,g_n) be a smooth Riemannian manifold; $D_n \subset M_n$ a positive cone domain.

- **Primary gradient G_n:** level sets $\{p \in D_n : I_n(p)=c_n\}$ of a smooth invariant I_n.
- **Asymptotes:** vector fields Y_n, X_n tangent to G_n's asymptotes with $g_n(X_n,Y_n)=0$.
- **Balance axis B_n:** locus of equal tendency.
- **Paradox point P_n:** $T_{P_n}G_n \perp T_{P_n}B_n$ under g_n; treat as **limit/excluded** unless divergence is proved.
- **Circulation Z_n:** tangent to G_n; generates an **isometry flow** Φ_n^t preserving G_n; bounded intensity $\varepsilon \leq \| Z_n \|_{g_n} \leq M$.
- **Recursion:** $O_{n+1} := P_n$ (point→frame inheritance).
- **Viewing angle $\theta \in [0°,90°]$:** observation direction relative to G_n; same Z_n appears as rotation ($\theta \approx 0°$), oscillation ($\theta \approx 90°$), or waves ($0° < \theta < 90°$).

Modeling guardrails. State the domain where Φ_n^t preserves G_n and bounds on $\| Z_n \|$. Divergence at P_n is heuristic until metric-specific proof.

1.3 Parametric Time (PT) — axioms & definitions [T0]

> **Plain English:** Time is many small swings whose size depends on scale. Your “now” is their average at your scale.

- **PT-1 (Co-emergent poles):** Past/Future define each other.
- **PT-2 (Parametric reality):** Observable time is a projection from parameter space Ω with oscillatory modes $\{\vartheta_i\}$.
- **PT-3 (Scale invariance):** Temporal structure is self-similar across scales.

Definitions ($s>0$, $\alpha>0$).

- **Oscillatory diameter:** $D(s)=2\pi\, s^\alpha$.
- **Temporal oscillation:** $T(\vartheta,s)=\tfrac{1}{2}D(s)\cdot\cos(\vartheta/s)+\mathrm{Offset}(s)$, with smooth Offset.
- **Scale-relative present:** $\mathrm{Present}(s)=\langle T(\vartheta,s)\rangle_{\tau(s)}$, with averaging window $\tau(s)$ (e.g., $\propto 1/s$).

Well-posedness. Specify admissible s, regularity of Offset, and τ’s scaling law.

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2) Tier-1: Theorems / Propositions (from Tier-0)

> **Plain English:** What must follow if you accept Tier-0. No metaphors—just implications with scope.

2.1 Circulation Sustainability Theorem [T1]

> **Plain English:** Without swirl, systems collapse or escape; with the right swirl and a compact path, they keep circulating.

Dynamics split. Total flow: $\dot{x} = -\nabla\rho(x) + Z_n(x)$, where ρ pulls toward P_n/asymptotes; Z_n is tangent to/preserves G_n; $\varepsilon \le \lVert Z_n \rVert \le M$.

Theorem (Sustainability). If there exists a **compact (or compactified)** invariant set $\mathscr{A} \subset G_n$ for Φ_n^t, then trajectories initialized near $\mathscr{A}$ remain **bounded** and exhibit **sustained circulation**. If $Z_n \equiv 0$, $-\nabla\rho$ yields collapse/escape (no sustained interior dynamics).

Sketch. Z_n supplies tangential motion preventing radial collapse; bounded intensity + compactness preclude escape; invoke invariance/LaSalle. *(Note: no line-integral condition is assumed.)*

2.2 Constant-Accuracy Invariance Proposition [T1]

> **Plain English:** Pure ratios that survive every zoom/unit change have stable truth; extra digits only shrink error bars.

If R is dimensionless and S^+-invariant, its value is scale/unit-independent; precision affects estimators, not R.

2.3 Canonical ratios as structural lemmas (mechanism-bound) [T1]

> **Plain English:** Use the right tool for the right mechanism—don't overreach.

- **π (turn counter):** linear→phase around an excluded center; invariances: S^1, rotations.
- **e (proportional flow / pure turning):** solutions to $\dot{x}=kx$; rotations e^{iφ} with period 2π.
- **φ (sustainable spacing):** incremental addition on rotating ring/sphere with minimal coupling → least clumping at golden angle.
- **√2 (orthogonal bridge):** L_2 diagonal; equal-weight splits normalize with 1/√2 in orthogonal bases.
- **δ (edge-of-chaos scaling): smooth unimodal maps with a quadratic maximum** exhibit universal period-doubling interval ratios → δ.

2.4 Viewing-angle equivalence (projection) [T1]

> **Plain English:** One flow, many faces—spin, bounce, wave—depending on where you watch from.

For projections Π_θ (angle θ to G_n), the reduced dynamics $Π\_θ∘Φ_n^t$ form a **semi-conjugate** family: rotation-dominant (θ≈0°), oscillation-dominant (θ≈90°), wave/spiral (intermediate θ). *(Projection reduces dimension; hence semi-, not full conjugacy.)*

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3) Tier-2: Conjectures (clearly marked)

> **Plain English:** Best, testable guesses with what to measure and how they could fail.

- **C1 — Closure numbers:** Long-lived shells persist only within **narrow, dimensionless windows** (α-like) balancing circulation vs binding.
- **C2 — Entropy→Expansion feedback:** Coarse-grained entropy production adds explanatory power for cosmic acceleration.
- **C3 — Temporal oscillation signatures:** With suppressed decoherence, residual peaks scale as D(s)=2π s^α.
- **C4 — Edge-of-chaos integration:** Networks show δ-consistent scaling and peak integration/segregation near period-doubling transitions.

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4) Tier-3: Interpretations & Implications (separate from logic)

> **Plain English:** Meaning-making. Cite upstream claims; don't present as proofs.

- **I1 — TTC correspondences:** Hub-void ↔ rotation about an unreachable center (π); Return ↔ e^{iφ}; Two→Three ↔ √2 & φ.
- **I2 — Non-historic vs pre-historic:** Living recursion vs linear archive; aligns with §2.1 & §2.4.
- **I3 — God/Not-God co-emergence:** Named absolutes co-arise with their negations (echo of PT-1).
- **I4 — Wheel/Bellows/Vessel pedagogy:** Three projections of one flow; a teaching lens.

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5) Dependency Graph (textual DAG)

> **Plain English:** A map of what depends on what; prevents leaning on unproven claims.

[T0] {CAVP; RSM; PT} → [T1] {§2.1–2.4} → [T2] {C1–C4} → [T3] {I1–I4}

Promotion/demotion: [T2]→[T1] when proved; [T3] never promotes; [T1]→[T2] if proof fails.

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6) Falsification & Tests (mapped to claims)

> **Plain English:** Every strong claim lists how it could fail.

- **CAVP / Constant-accuracy [T1]:** rescale; if ratio changes → not structural.
- **φ spacing [T1]:** rotate + incremental add w/ minimal coupling; φ should minimize long-run clumping; else fail.
- **Feigenbaum δ [T1]:** measure period-doubling intervals; lack of δ-convergence (after conditions) → fail.
- **C1–C4 [T2]:** see experiment briefs (mechanism, measurable, expected ratio, fail criteria).

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7) Claim Hygiene & Style Guide

> **Plain English:** House rules so readers always know: proof, proposal, or poetry.

- State **invariance groups** for "structural" claims ($\geq S^+$).
- **Mechanism first, metaphor second.**
- One primary **tier tag** per claim; cite dependencies.
- **Quantify scope:** domain, assumptions, failure modes.
- **Singularity handling:** divergence at P_n is heuristic pending proof; treat as limit/excluded point.
- **No agency smuggled:** "Given (mechanism), it follows that (constraint)."

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8) Worked 2D Specialization (templates)

> **Plain English:** A small sandbox to see the math, not just words.

A. Non-compact hyperbola (Euclidean). Domain: $x>0, y>0$. G: $xy=c>0$. B: $y=x$. P: $(\sqrt{c},\sqrt{c})$. Tangent field $\dot{x}=\omega x$, $\dot{y}=-\omega y$ preserves $xy=c$ but is **unbounded** along a branch → illustrates **need for compactification** for periodic motion.

B. Compactified angle. $(u,v)=(\ln x, \ln y)$, $u+v=\ln c$ (a line). Identify $u\sim u+2\pi \to S^1$; choose $\bar{u}=\Omega$ → **closed orbits** (compact invariant set) so §2.1 applies.

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9) Glossary (minimal)

Plain English: Quick look-ups so no one has to guess.

S^+ (rescaling group); CAVP (structure vs description); $G_n, X_n, Y_n, B_n, P_n, Z_n, O_n$ (gradient, axes, balance, paradox point, circulation, inherited origin); $\boldsymbol{\theta}$ (viewing angle); $\boldsymbol{\vartheta}$ (parametric-time phase); δ (Feigenbaum); φ (golden ratio).
