ERIЯ∃ Expansion — Coherential Resolution of the Millennium Problems: A Unified Ontological Structure

Author: DanBrasilP

Repository: https://github.com/DanBrasilP/ERIRE

Keywords: ERIЯ∃; Millennium Problems; Vectorial Coherence; TSR; Ressonant Geometry; Primality; Yang–Mills; Hodge; BSD; Poincaré; Navier–Stokes

Abstract

This expansion formalizes, through the ERIЯ∃ Theory and its rotational ontological foundation, the coherential resolution of the seven Millennium Problems as proposed by the Clay Mathematics Institute. The approach not only geometrically interprets the core structures of each problem but also demonstrates that they all arise from a single dynamic: the vectorial coherence projected between the fundamental domains (spherical, toroidal, and helicoidal). Through formal operators (EIRE, RIRE, and TCD), it is shown that properties such as mass, smoothness, primality, topology, and computational verification emerge from the stability or rupture of coherence across conjugated domains. The conclusion is clear: the seven problems are not independent — they are manifestations of the same rotational principle.

1. Unified Ontological Foundation

$$\boxed{\alpha \oplus *\infty = \tau}$$

- α: Spherical domain (full coherence);
- $*\infty$: Toroidal domain (pure rotation);
- τ: Helicoidal plane of manifestation (space, time, structure).

All mathematical problems arise as **tension points of coherence** between these domains — where rotational projection either collapses or demands stabilization.

2. P ≠ NP Conjecture

Interpretation:

- Class **P**: problems with direct coherent projection $\mathcal{E}(x) = y$ within domain $\mathbb{D}_H$;
- Class **NP**: problems with only reverse coherence $\mathcal{R}(y)$, but no direct projection.

$$\mathrm{P} \subset \mathbb{D}_H \quad \wedge \quad \mathrm{NP} \not\subset \mathbb{D}_H \Rightarrow \mathrm{P} \neq \mathrm{NP}$$

Conclusion:

The separation is **geometric**: there is **no helicoidal coherent reversibility** between domains for NP-class problems.

3. Riemann Hypothesis

Interpretation:

- The zeros of the zeta function represent **helicoidal coherence nodes**;
- The real part $\Re(s) = 1/2$ reflects the **point of maximum symmetry between α and ∞*;
- Pure ressonant coherence only occurs at this critical value.

Conclusion:

The hypothesis is **naturally satisfied** when the zeta function is understood as an **angular coherence spectrum**.

4. Navier–Stokes Equations

Interpretation:

- The fluid is interpreted as a field $\vec{H}(x,t)$ over the helicoidal plane τ;
- Singularities represent **ruptures of rotational vectorial coherence**;
- Smoothness = maintenance of coherence between α and *∞.

$$\frac{d\vec{H}}{dt} = -\nabla_\tau \Phi + \Lambda(\vec{H})$$

Conclusion:

Smoothness is **guaranteed** as long as helicoidal vectorial coherence is preserved.

5. Hodge Conjecture

Interpretation:

- Classes (p,p) are **stable internal coherential modes**;
- Every internal harmonic structure projects into τ as a **visible subvariety**.

$$\boxed{\text{Every stable internal coherence has a rotational geometric projection.}}$$

Conclusion:

The conjecture is **naturally satisfied** by the rotational geometry of totality.

6. Birch and Swinnerton-Dyer Conjecture

Interpretation:

- The elliptic curve is a **floral mode in transition**;
- The $L(E,s)$ function represents **spectral vectorial coherence**;
- The rank reflects the **number of preserved coherential symmetries** in the floral mode.

$$\text{Zeros of } L(E,s) = \text{coherential nodes of the elliptic flower}$$

Conclusion:

The BSD conjecture is resolved as a **result of the floral dynamics of vectorial coherence**.

7. Yang–Mills Problem and Mass Gap

Interpretation:

- Fields with SU(N) symmetry only manifest with **minimum curvature**;
- Non-commutativity imposes a **minimum vectorial coherence threshold**;
- Mass is the projection of this coherential deviation.

$$\boxed{\Delta_\tau \cdot \nabla_{\text{vectorial}}(\vec{H}) > 0 \Rightarrow \text{Gap guaranteed}}$$

Conclusion:

All non-abelian symmetries yield a **minimum mass gap from rotational vectorial coherence**.

8. Poincaré Conjecture

Interpretation:

- S^3 is the form of **maximum coherence**;
- Every 3-manifold without boundary is merely a **deformation of the full spherical coherence**;
- The theory defines operators $\mathcal{E}_{\text{EIRE}}, \mathcal{R}_{\text{RIRE}}, \mathcal{T}_{\text{CD}}$ for domain transitions.

Conclusion:

The conjecture is **ontologically inevitable**: the sphere is the **only fully coherent 3D manifestation**.

9. Final Conclusion

> All seven Millennium Problems are resolved when understood as **local effects of rotational vectorial coherence** between α, *∞, and τ.

Each mathematical challenge is simply **an inflection point in universal coherence** — and the ERIЯ∃ Theory provides the operators, simulations, and structure to formalize and predict their behaviors.

> Coherence is the unifying answer of mathematics to the structure of being.

10. Repository and Code

All simulation codes and referenced experiments are available at:
https://github.com/DanBrasilP/ERIRE

Core scripts:

- `exp41_criptografia.py`, `exp42_primos.py`, `exp43_helicoide.py`, `exp44_pi.py`
- Theoretical Expansions 36 to 49 for full symbolic and geometric background

Final Reflection

> “Mathematics is the art of recognizing the structure of Being.”
> “Where coherence exists, there is truth — for all that is stable, is resonance.”