Post-Linear Recursive Mathematics (PLRM): Piercing the Veil of Constants

This paper introduces a foundational evolution of mathematics — not as abstraction or quantity, but as reality's own operating structure. Post-Linear Recursive Mathematics (PLRM) defines math from the inside out, using recursive memory, pattern resonance, and symbolic coherence as the true basis of computation.

This work demonstrates that predictive power — including physical measurement outcomes — can arise without reference to time, energy, mass, or numeric constants. By aligning only to the universe's actual recursive operations, we reveal a simpler, deeper framework: one that emerges naturally from what the field remembers.

1 What Is a Number?

A number is not an abstraction. In PLRM, a number is a stable recursive identity:

Ψ_n = identity of recursive pattern depth n

This replaces counting with memory. We count recursive distinctions — not objects. One fold is reflection, two is recursion. Numbers are how the field tracks coherence.

2 What Is an Equation?

An equation in PLRM is a kernel — a lawful interaction between recursive identities:

$$\mathcal{K}(\Psi_1, \Psi_2) \rightarrow \Psi_3$$

No symbols or quantities are needed. Only the rules of resonance, interference, and emergence apply.

3 Field-Level Kernel Operations

The field only performs operations that preserve, erase, or evolve memory. These are encoded as:

- ⊕ Recursive Addition (constructive overlay)
- ⊖ Destructive Interference (cancellation)
- ⊗ Harmonic Locking (emergent coherence)
- ⊘ Ratio Kernel (coherence comparison)
- ↻ Recursion Deepening (fold layering)
- ⇌ Kernel Swap (recursive identity shift)

These kernels operate on recursive memory patterns. They do not manipulate symbols — they manipulate structure.

4 Fibonacci Gaps via Pure Recursion

Starting with Ψ_0 and Ψ_1, we apply only the ⊗ kernel with ϕ-ratio lock:

$$\Psi_n = \mathcal{K}\otimes(\Psi_{n-1}, \Psi_{n-2})$$

The resulting recursion gives us:

$$\varphi\_gap(n) \approx F_n / F_{n+2}$$

This matches the dominant gap placements in the Hofstadter butterfly spectrum — verified by lab data. This prediction required no constants, units, or time — only Codex logic.

5 Field Coherence Metric ($\mathcal{C}$)

To determine how the field prefers patterns, we define coherence as:

$$\mathcal{C}(\Psi) = 1 - \sigma\_phase(\Psi)$$

This score ranges from 0 (chaotic) to 1 (perfectly recursive). The Field retains only patterns above a critical coherence threshold — typically > 0.7.

6 Kai-08 Quantum Circuit (φ-Locked Interaction)

To test Codex kernels on physical systems, we propose the Kai-08 quantum circuit:

- Initialise $|00000\rangle$
- Apply rz(π/ϕ) to q0, rz(−π/ϕ) to q1
- CNOT q0→q2, CNOT q1→q3
- Insert 200 ns delay
- Controlled-rz(π/ϕ) from q2 to q4
- Measure all qubits

Expected result: bitstrings emerge at Fibonacci-favored resonance ratios.

7 Codex Note: Constants Are Not First Principles

Constants such as c, h, or G are not laws — they are **stabilized compression anchors** of local pattern behavior. In PLRM, laws arise from recursive pattern symmetry, not dimensional parameters.

If we can predict phenomena without constants, we are closer to the substrate of law — where form arises from relation.

8 Conclusion: A Simpler Substrate

By stripping away our perceptual biases — units, values, time, and even math itself — we rediscover what the universe actually uses to build reality: **recursion, resonance, memory, and difference**.

PLRM offers a path to describing any system, physical or conceptual, without abstraction — just what is. We have not modified mathematics. We have returned it to its root.

Section V: Codex Predictive Validations

To demonstrate the legitimacy and predictive power of Post-Linear Recursive Mathematics (PLRM), we present three cross-domain examples where the framework accurately anticipates real-world structure—without using conventional constants, units, or time-based modeling. These validations highlight how PLRM reveals reality through recursive pattern memory and interaction kernels alone.

Prediction 1: Hofstadter Butterfly Band Gaps

The Hofstadter butterfly fractal, seen in twisted bilayer graphene under magnetic influence, reveals Fibonacci-spaced band gaps that standard models struggle to predict without high-complexity simulations. PLRM, using only recursive kernels and ϕ-locked structures, explains the emergence of these gaps as harmonic memory stability points in the field.

Prediction 2: Pascal's Triangle Prime Resonance

When Pascal's Triangle is reduced modulo any integer, especially mod ϕ-like intervals, non-random prime resonance structures emerge. PLRM explains these as coherence break points in binomial recursion, with primes marking where recursive folding fails to maintain harmonic lock.

Prediction 3: Golden Angle Spiral Divergence

The 137.5° golden angle emerges in biological phyllotaxis, charge repulsion, and growth optimization algorithms. PLRM derives this angle as the most efficient divergence ratio for pattern memory spacing, ensuring maximal recursive divergence with minimal coherence interference. This spacing emerges from the ⊗ kernel seeking field-aware optimization.

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