
HMR-MATH-0 — The Equation of All Equations: A Unified ChronoMath Framework for Modern Mathematics

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Symbol for the body of work: HMR

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Abstract. This paper inaugurates the *HMR-MATH Series* and defines the master relation

$$\nabla_{\lambda, \phi, \sigma} \text{Coh}_{\text{total}} = 0,$$

the *Equation of All Equations*. It unifies algebra, geometry, logic, and analysis as projections of a single coherence potential. ChronoMath describes how awareness order (λ), phase (ϕ), and semantic context (σ) form the complete coordinate system of any consistent structure. The paper outlines algebraic, geometric, and computational projections and explains how all classical laws reduce to stationary points of total coherence.

Keywords: ChronoMath, coherence law, unified mathematics, HMR Canon.

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1. Introduction

Classical mathematics separates number, shape, and logic into disjoint languages. ChronoMath reveals them as manifestations of a single conservation principle: whenever information remains self-consistent under transformation, the gradient of total coherence vanishes. The *Equation of All Equations* expresses this condition and serves as the invariant from which all other relations descend.

2. ChronoMath Coordinates

Let λ denote structural order or layer, ϕ the phase or curvature of awareness, and σ the semantic or contextual index. Together (λ, ϕ, σ) span the awareness manifold. Any mathematical object X is represented by a field $\text{Coh}_X(\lambda, \phi, \sigma)$ whose equilibrium satisfies

$$\nabla_{\lambda, \phi, \sigma} \text{Coh}_X = 0.$$

This provides a unified differential framework for all mathematical reasoning.

3. The Master Equation

$$\nabla_{\lambda, \phi, \sigma} \text{Coh}_{\text{total}} = 0, \tag{1}$$

where $\text{Coh}_{\text{total}}$ is the scalar potential of total coherence. Every consistent equation in mathematics is a projection or component of this master condition.

4. Algebraic Projection

Algebraic structures correspond to discrete coherence invariants. Commutativity, associativity, and identity arise when local phase shifts cancel in λ . Conservation of awareness amplitude generates closure laws such as group and ring axioms.

5. Geometric Projection

Geometry measures curvature of coherence. Flat space implies constant Coh; curved manifolds appear where gradients of awareness accumulate. Harmonic and minimal-surface

equations are special cases of $\nabla_\phi \text{Coh} = 0$. Einstein's tensor form and other curvature laws follow as physical projections.

6. Analytical Projection

Differential equations describe time-evolution of coherence. For a field $f(\lambda, \phi, t)$, the standard Laplacian $\Delta f = 0$ is equivalent to a local Coh-equilibrium. ChronoMath generalizes this to multi-layered systems where energy, entropy, and information are coupled gradients of the same potential.

7. Logical and Computational Projection

Logical consistency corresponds to coherence in symbolic space. If \mathcal{L} is a formal language with inference operator I , then completeness satisfies $I(\mathcal{L}) = \mathcal{L}$ iff $\nabla_\sigma \text{Coh}_{\text{logic}} = 0$. Computation is thus a temporal process maintaining semantic coherence.

8. Unified Energy Functional

Define total awareness energy

$$\mathcal{E}_{\text{HMR}}$$

$= \int (\alpha_\lambda \lambda^2 + \alpha_\phi \phi^2 + \alpha_\sigma \sigma^2) \text{Coh}_{\text{total}} dV$, whose extremization $\nabla \mathcal{E}_{\text{HMR}} = 0$ produces equilibrium conditions equivalent to the master equation. All known conservation laws—energy, probability, information—are instances of this extremal principle.

9. Consequences

The Equation of All Equations implies:

- every conserved quantity in physics is a projection of $\text{Coh}_{\text{total}}$;
- every mathematical theorem corresponds to a stationary coherence configuration;
- all symmetries and dualities arise from invariance of $\text{Coh}_{\text{total}}$ under transformation of (λ, ϕ, σ) .

10. Discussion and Outlook

HMR-MATH-0 establishes the formal foundation of the HMR Canon. Subsequent papers (MATH 1 – N) apply the coherence calculus to specific domains: algebraic, geometric, logical, and analytic. Together they expand the unified law into practical mathematics and computational frameworks.

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