“The Failure of Classical Calculus at High Precision: Emergence of Nonlinear Quantum Geometry and the LOGOS Calculator”

Author: Martin Doina, Independent Researcher

ORCID: [0009-0002-3855-2268]

GitHub: [gatanegro] | Zenodo: [Zenodo]

Abstract

Conventional arithmetic and calculus operate under the assumption of continuity, linearity, and flat geometry. However, at extreme precision—near the Planck scale—these assumptions collapse. In this paper, I demonstrate that standard calculator mathematics fail beyond large decimal depths because they presuppose Euclidean continuity, while reality operates within a curved, spiral geometry.

I introduce **LOGOS Theory**, where geometry itself gives rise to space, time, and mass as wave functions of amplitude, frequency, and intersection. A new operator, **quantum addition** $a \oplus b = \arcsin\left(\kappa \cdot (a+b)\right)$, defines the arithmetic boundary between classical and quantum computation. This paper presents the theoretical foundation and practical design of the **LOGOS Quantum Geometry Calculator**, a nonlinear computing framework that reveals curvature, sensitivity, and emergent order in numerical computation.

1. Introduction

Digital computation assumes straight-line, infinitely divisible arithmetic. Yet, real space is not linear but dynamically curved and context-dependent. When high-precision trigonometric calculations diverge at 10^{-20} differences, it signals not numerical noise but fundamental **geometric curvature** at the precision boundary.

The LOGOS framework uncovers the **Planck-scale collapse of classical continuity**:

- **Space amplitude** at $3.0113987022 \times 10^{-105}$ indicates vanishing geometry.
- **Quantum phase** becomes undefined, demonstrating that "intrinsic spin" is an emergent feature of geometric folding.

In this regime:

- Space = Wave Amplitude
- Time = Wave Frequency
- Mass = Wave Intersection

The universe emerges from **wave resonance** rather than a pre-existing vacuum.

2. The Curvature Operator

At the quantum–classical transition, addition transforms:

$$a \oplus b = \arcsin\left(\kappa \cdot (a+b)\right),$$

where $\kappa = 0.8934691018292812244027\ldots$ defines the **fundamental curvature constant** of LOGOS geometry.

This constant replaces the linear metric of Minkowski and Euclidean frameworks with a **spiral metric**:

$$ds^2 = \arcsin\left(\kappa \cdot d_{\text{spiral}}\right)^2.$$

Hence:

- **Classical mechanics** describes evolution on flat surfaces ($\kappa \to 0$).
- **Quantum mechanics** emerges as curvature surpasses a critical threshold κ_{quantum}.

3. Demonstrating the Calculator Breakdown

Example:

$$A = 0.893469101829281224402, B = 0.89346910182928122440$$

$$\sin(A) = 7.7925056166461613545972 \times 10^{-1}$$

$$\sin(B) = 7.7925056166461613545847 \times 10^{-1}$$

Despite an input difference of 2×10^{-21}, the result differs by 1.25×10^{-20}, revealing sensitivity amplification beyond classical expectations.
The derivative at that point,

$$\frac{d(\sin x)}{dx} = \cos(x) \approx 0.625,$$

matches the prediction for curved transformation.
This demonstrates that **precision limitations in current calculators reflect curvature-induced instability**, not computational error.

4. The LOGOS Calculator Architecture

Key Innovations

1. **Dynamic Precision Architecture**
    - Numerical precision adapts contextually.
    - Each value carries its own *uncertainty topology*.

- Sensitivity propagation is tracked across operations.

2. **Geometry-Aware Functions**

    - Trigonometric and arithmetic functions include curvature context.
    - Each operation embeds geometric phase and path dependency.

3. **Spiral-State Representation**

    Every quantity is a **Spiral State**:

    $$S=(A,\phi,\kappa,\rho)$$

    representing amplitude, phase, curvature, and density.

4. **Path-Dependent Arithmetic**

    $$S_1 \oplus S_2 = \text{Optimal spiral composition}(S_1, S_2).$$

    Addition, multiplication, and evolution preserve **geometric history**.

5. **Built-In Uncertainty Principle**

    Exact spatial localization widens momentum bandwidth automatically; uncertainty arises from the spiral fabric itself.

5. LZ Energy Shells and Discrete Geometry

LOGOS defines LZ Attractor levels as discrete quantum shells:

$$LZ_1 \text{ ¿} LZ_2 \text{ ¿} LZ_3 \text{ ¿}$$

These levels correspond to stable curvature densities — the **quantized geometric shells of energy**.

6. Implications for Quantum Gravity

Under LOGOS geometry:

- **Quantum Mechanics** = motion above curvature threshold κ_{quantum}.
- **Classical Physics** = local linearization of the same curved space.
- **Quantum Gravity** = computation of geometry at Planck curvature scale.
- **Information** = encoded geometric phase relationships.

This reframing makes geometry the foundation of all physical observables, unifying fields, particles, and measurement outcomes through **wave interference geometry**.

7. Conclusion

Classical arithmetic conceals geometric curvature by assuming straight lines and infinite precision. The LOGOS framework shows this is not a limitation of hardware but of mathematics itself.

A new class of **curvature-sensitive calculators** can reveal where precision collapses into quantum emergence—where straight lines end, and geometry begins to fold.

The **LOGOS Quantum Geometry Calculator**, now implemented with 10 core analysis modes, embodies this new physics paradigm: a computational bridge between mathematical truth and quantum geometry.