

Symbolic Number System and Logic Architecture for Zero-Free Computation and Compression

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Abstract:

This whitepaper introduces a novel symbolic number system and logic architecture that eliminates the concept of zero and redefines symbolic computation and compression. The system leverages mirrored symbolic digit sets and a finite representation of mathematical constants to create a new foundation for logic and number theory.

Motivation:

Classical computation relies on binary (0s and 1s) and continuous mathematics built on calculus and irrational constants. This symbolic system proposes a structurally finite and discrete alternative, avoiding the conceptual pitfalls of irrational numbers and zero.

Core Concepts:

- Symbolic Digit System: Uses mirrored symbolic digits (e.g., 1-6, 11-16) and multiple tiers (e.g., 21-26 <-> 31-36).
- Zero-Free Logic: Operates without zero, using mirrored pairs for balance and calculation.
- Symbolic ALU: Implements operations such as ADD, SUB, NOT, AND, OR, XOR.
- Macro Folding: Compresses symbolic expressions using pattern reuse and tiered encoding.
- Symbolic Constants: Finite representations of π , 2, and $\sqrt{2}$ within the symbolic structure.
- Symbolic-to-Binary Encoding: Enables practical use and export for compression and logic operations.

Applications:

- Symbolic Compression Algorithms

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- Symbolic Logic Simulators
- Zero-Free Mathematical Systems
- Artificial Intelligence & Symbolic Programming
- Historical Preservation of Symbolic Systems

Legacy Packaging:

- Exported symbolic macro library
- Symbolic unit test suite
- Compressed symbolic Fibonacci and primes programs
- Blockchain-ready creator proof bundle

Philosophical Note:

This system is not a rejection of calculus but a philosophical and structural advancement. By replacing the infinity of irrational numbers with closed symbolic expressions, it sets the stage for precise and verifiable computation beyond limits of traditional math.

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