Short Communication Current Research in Traffic Transportation Engineering

U4: T0=2
A Four-Symbol Foundation of Mathematics

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Abstract
*We present **U4**, a 4-symbol axiom that encodes the entire birth–dissolution cycle of natural- number arithmetic. The equation **T0=2** simultaneously asserts (i) the presence of the zero- point, (ii) the immediate emergence of one from zero, (iii) the automatic collapse of one into two, and (iv) the ultimate identity 0=1=2. No external primitives are presupposed.*

Keywords: Minimal Axiom, Four-Symbol Foundation, Birth of Number, Zero-One-Two Collapse.

1. Signature

• One type U = {0, 1, 2}.
• One unary operator T: U → U with cycle T0 = 1, T1 = 2, T2 = 0.

2. Axiom

The single axiom

$$T0 = 2$$

is the Unity Equation. It abbreviates the full chain

$$0 \xrightarrow[T]{} 1 \xrightarrow[T]{} 2$$

and collapses to identity when 0 = 1 = 2.

3. Dissolution Theorem

Theorem. $T0 = 2 \vdash 0 = 1 = 2 \Longleftrightarrow \forall n \in \mathbb{N}\ (n = 0)$. Proof. If T0 = 2 and 1 = 2, then T0 = T1 = 2 and T2 = 0 give 0 = 1 = 2. Conversely, if all numbers coincide, T is the identity and T0 = 2 collapses.

4. Comparison

System	Primitives	Length	Single Equation?
Peano	0, succ	11+	No
ZF	∅, ∈	1000+	No
U4	0,1,2, T	4	**Yes**

References

The paper is self-contained; no external citations are required.