

KEY CONCEPTS

William Bricken

March 1987

Laws of Form, like all seminal works, takes years of applied study to comprehend. I know about six people in the US that *understand* it. The rest of the folks are merely expressing opinions.

GSB is an eccentric. This hurts the propagation of the ideas, cause folks confuse the man with the ideas.

Isomorphism with Boolean algebra has been demonstrated by Schwartz.

The key concepts are boundary mathematics, non-representation, and argument sets. Few folks have exposure to applications of these concepts, with the exception of logic. The boundary mathematics research community has demonstrated utility in integer arithmetic, set theory, knot theory, network theory, and other abstract domains. Little of this work is published.

A quick example, Kauffman Arithmetic:

* is the unit

(...) is doubling, so $(a) = 2a$

juxtaposition is adding, so $a b = a + b$

substitution for * is multiplying

Rules of computation:

$$A: \quad ** = (*)$$

$$B: \quad \dots)(\dots = \dots \dots$$

So,

$$1 = *$$

$$2 = ** = (*)$$

$$3 = *** = (*)^*$$

$$4 = **** = (*)** = (*)^*(*) = (**)^* = ((**))^*$$

$$2 + 3 = (*)^*(*)^* = (**)^* = ((**))^*$$

How to multiply: for example, 2×3

1. represent 2 as ** [or as (*)]
2. replace each * by 3 = (*)*

$$\begin{aligned} 2 \times 3 &= (*)^* (*)^* && \text{[since } 2 = ** \text{ and } 3 = (*)^* \text{]} \\ &= (*) (*)^{**} && \text{[rearrangement is free]} \\ &= (**)^{**} \\ &= ((*))^{**} \\ &= ((*)) (*) \\ &= ((*)) (*) \end{aligned}$$

Note that $2 = (*)$ also, so

$$2 \times 3 = ((*))^*$$

directly by substituting $(*)^*$ for * in $(*)$

Note also

$$3 \times 2 = ((*)) (*) = ((*))^*$$

by substituting $(*)$ for * in $(*)^*$ and simplifying.

Laws of Form is *not mathematics* to the same extent that the representation of \emptyset is not mathematics to the Roman numeral system, imaginary numbers are not mathematics to the Renaissance, Leibniz notation for calculus is not mathematics to eighteenth century English Newtonians, incompleteness results are not mathematics to Hilbert, etc. History is clear that established mathematicians prefer to reject strong generalizations. But the fact remains that our implementations of boundary logic for deduction in Artificial Intelligence systems compute orders of magnitude faster than other existing approaches precisely because boundary mathematics and non-representation are powerful formal concepts.