Abstract

Containment Theory presents an alternative foundation to classical Set Theory, replacing the primitive notion of membership ($\in$) with spatial containment through boundary distinctions. Building on G. Spencer-Brown's *Laws of Form* (1969), we develop a complete computational framework for boundary logic that demonstrates its equivalence to Boolean algebra while offering distinct advantages in parsimony, geometric intuition, and handling of self-reference.

The calculus of indications operates from just two axioms: **Calling** ($\langle\langle a \rangle\rangle = a$, double crossing returns) and **Crossing** ($\langle\,\rangle\langle\,\rangle = \langle\,\rangle$, marks condense). From these primitives, we derive the complete Boolean algebra, establishing that the marked state $\langle\,\rangle$ corresponds to TRUE and the unmarked void to FALSE, with enclosure $\langle a \rangle$ representing negation and juxtaposition ab representing conjunction.

We present a reduction engine that transforms arbitrary boundary forms to canonical representations, prove termination in polynomial time for ground forms, and verify all derived theorems