Truth-Only Logic

Abstract: TBD

Contents

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1. Introduction

The principle aim of this paper is to articulate, define, and defend a class of logics I shall henceforth call ***Single-Valued Logics*** and from which I will develop a ***Truth-Only Logic***.

2. Conceptions of Truth

Gottlieb Frege provided the most comprehensive and systematic analysis of the notion of truth found most frequently throughout logic and mathematics (1890's). On that view, ***The True*** is cleanly separated from ***The False***.

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The True  ⋮  The False
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Fig.1 – Fregean conception.

The True and ***The False*** are conceived as unitary objects and are treated as such within truth-functional systems that adhere to that philosophy. Tokens '⊤' and '⊥' are singularly instantiated.

Truth and ***Falsity*** are complementary, dual-pairs, existing as an oppositional symmetry.

Simple dual-symmetries of this sort give rise to powerful tools. Discourse, and the ability to make "progress" through the negation and refutation of ideas becomes possible.

3. Defense of The Comparative Theory of Truth

"There are no facts, only perspectives."

Many philosophers have previously defended alternatives to the so-called correspondance theory of truth. The quote at the top of this section originates in Friedrich Nietzsche's observations in the 1870's. Others, such as Ludwig Wittgenstein have critiqued the possibility of the ***picture-theory of meaning and language*** (which involves *correspondance qua isomorphism*) in 1913.

Here, I will introduce and defend the ***comparative theory of truth*** which asserts:

1. There are no falsehoods only truths.
2. Some truths are better or worse than other truths.
3. Truths can be ordered by how much better or worse they are compared to other truths.

One way to instantiate a ***comparative theory of truth*** is through what I shall call a ***Single-Valued Logic*** where Truth-Values are identified with a specific subset of a singular, top-level, Truth-Value and each subset is ***ordered***.

4. Single-Valued Logics

Definition 1. *Single-Valued Logic*.

1. A logic L with a single-valued semantics T such that:
    a. T is a totally ordered set
    b.

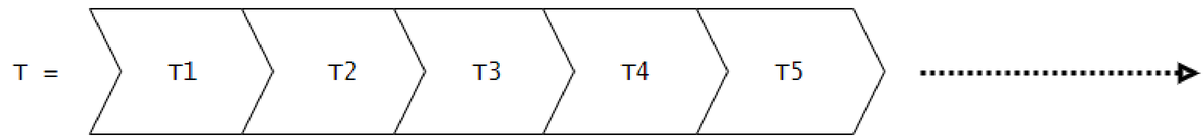

Fig. 2 – The comparative theory of truth.

5. Truth-Only Logic

6. Formalization

A single non-atomic top-level Truth-Value T partitioned into subsets $\{T_0, T_1, \ldots, T_n\}$ such that T:

* $T_0 < T_1 < T_2 \ldots < T_n < T$

A class of *wff* W are mapped to T such that for every $w \in wff$: $w \rightarrow T$. The truth-table for L^T can be defined by referring to the corresponding Classical semantics of each logical operator. Note that the formulation below is standard, we might permutate the axiom to see what the system entails (thereby identifying not one but two whole new systems).

Consequent preservation of the material conditional.

The material conditional preserves the truth-value of the consequent.

1. The *Classical Truth-Value* of a *material conditional* is defined by:
   a. *If* $I(q) = T$ *then* $I(p \rightarrow q) = T$
   b. *If* $I(q) = F$ *and* $I(p) = T$ *then* $I(p \rightarrow q) = F$

2. Correspondingly, the *Single-valued Truth-Value* is defined by:
   a. *If* $I(p) < I(q)$ *then* $I(p \rightarrow q) = I(q)$
   b. *If* $I(q) < I(p)$ *then* $I(p \rightarrow q) = I(q)$

Negation complementation.

Negation reverses a truth-value or maps the proposition to the complement.

1. The *Classical Truth-Value* of a *negated proposition* is defined by:
   a. *If* $I(p) = T$ *then* $I(\neg p) = F$
   b. *If* $I(p) = F$ *then* $I(\neg p) = T$

2. Correspondingly, where * indicates the set-theoretic *complement* of *function*, the *Single-valued Truth-Value* is defined by:
   a. *If* $I(p)$ *then* $I(\neg p) = I(p)^*$
   b. *If* $I(\neg p)$ *then* $I(p) = I(\neg p)^*$

TBD – Two ways at least strong negation or weak negation. Former involves the *full complement*. Weaker involves *any other set*.

Conjunct conservation.

Conjunction requires that both conjuncts be true.

1. The *Classical Truth-Value* of a *conjunction* is defined by:
   a. *If* $I(q) = T$ *and* $I(p) = T$ *then* $I(p \,\&\, q) = T$
   b. *Else*, $I(p \,\&\, q) = F$

2. Correspondingly, the *Single-valued Truth-Value* is defined by:
   a. *If* $I(p)$ *and* $I(q)$ *then* $I(p \,\&\, q) = I(\neg p)^* \cup I(\neg q)^*$

TBD – 2a …

Disjunctive preservation.

Two principles largely shape and define disjunction: (1) weakening ($p \vdash p \vee q$) – preserve the value of p and (2) that p's being true is sufficient for the proposition $p \vee q$ being true. The former is a rule of inference (and in many systems an introduction rule allowing a disjunct proposition to appear in a proof), the latter line of thought is used to justify the former.

1. The *Classical Truth-Value* of a *disjunctive conservation* is defined by:
   a. *If* $I(q) = F$ *and* $I(p) = T$ *then* $I(p \vee q) = T$

2. Correspondingly, the *Single-valued Truth-Value* is defined by:
   a. *If* $I(p) < I(q)$ *then* $I(p \vee q) = I(q)$

See alternatives below.

7. Relationship to Many-Valued Logics

[0, .5, 1] would be but not [$\top$, $\perp$, $\top\perp$]

8. Recovering Boolean Algebra

Borrowing from the debate on the closure of the justification and other epistemic operators commonly found in formal epistemology, I'll take to using the following linguistic idiom here:

Definition. *Knowledge Transmission***.**

$$(P \rightarrow J) \rightarrow (@P \rightarrow @J)$$

The material implication of J from P, entails that J is knowable from P. Indeed, that J is even justified from P's being justified.

This has been dubbed knowledge transmission.

Works Cited

Akerlof, George. "The Market for "Lemons": Quality Uncertainty and the Market Mechanism" *The Quarterly Journal of Economics* Vol. 84, No. 3. (Aug., 1970), pp. 488-500.