

Semantic WFF(x) specified syntactically

According to Wikipedia: $x \models y$ is a semantic rather than syntactic relationship. I specify this relationship as syntactic because I can see how this relationship can be formalized using Rudolf Carnap (1952) Meaning Postulates.

Hypothesis:

WFF(x) can be applied to the semantics of formalized declarative sentences such that:

$WFF(x) \leftrightarrow (\sim True(x) \leftrightarrow False(x))$ // (see proof sketch below)

For clarity we focus on atomic propositions expressing a single relation between two Things.

Alfred Tarski: // metalanguage M defines expressions in object language L

$\forall x True(x) \leftrightarrow \phi(x)$ // Tarski's Formal correctness of True(x) formula

Sketch of a proof of the hypothesis:

Thing : Relation : Binary-Relation // inheritance hierarchy

$\forall a \in Binary-Relation \exists b \in types \ \& \ \exists c \in types \mid Compatible-Types(a, b, c)$

$Get-Binary-Relation(x) \mapsto (binary-relation \in Binary-Relation \vee \emptyset)$

$\forall x True(x) \leftrightarrow \phi(x)$ // Tarski's Formal correctness of True(x) formula

$\phi(x) \leftrightarrow WFF(x) \ \& \ binary-relation(arg1, arg2)$

$WFF(x) \leftrightarrow (Get-Binary-Relation(x) \ \& \ Compatible-Types(binary-relation, arg1, arg2))$

Truth Teller Paradox: "This sentence is true" $\leftrightarrow x \models True(x)$

To evaluate True(x) we begin with WFF(x) corresponding to:

(a) Binary-Relation(x) == true // Logical-Entailment is a binary relation

(b) Compatible-Types(Logical-Entailment, x, True(x))

The second argument to Logical-Entailment specifies infinite recursion, thus $\sim WFF(x)$.

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