

## The Prolog Inference Model refutes Tarski Undefinability

The generalized conclusion of the Tarski and Gödel proofs: All formal systems of greater expressive power than arithmetic necessarily have undecidable sentences. Is not the immutable truth that Tarski made it out to be it is only based on his starting assumptions.

When we reexamine these starting assumptions from the perspective of the philosophy of logic we find that there are alternative ways that formal systems can be defined that make undecidability inexpressible in all of these formal systems.

### Eliminating Undecidability in Formal Systems

When the conventional way that formal systems are defined is considered a necessary truth rather than a set of basic assumptions anything that is said from the perspective of philosophy of logic alternatives to these basic assumptions will be misconstrued as erroneous.

Very slight changes can be made to the way that formal systems are defined eliminating undecidability in all of these formal systems. The key change is that undecidable sentences are decided to have a truth value of  $\sim$ True.

The remaining sentences are True based on their provability or False based on the provability of their negation. By provability I mean that they are theorems because their premises are the empty set.

Tarski "proved" that there cannot possibly be any correct formalization of the notion of truth entirely on the basis of an insufficiently expressive formal system that was incapable of recognizing and rejecting semantically incorrect expressions of language.

Prolog queries return "Yes" when-so-ever an expression is provable on the basis of the Facts and Rules in its database and returns "No" otherwise. Facts correspond to axioms, Rules correspond to rules-of-inference and the Prolog database corresponds to a formal system.

### Inference in the Prolog Model

True(x) means Provable(x) from the Facts and Rules in its database.  
 False(x) means Provable( $\sim$ x) from the Facts and Rules in its database.  
 $\sim$ True(x) means  $\sim$ Provable(x) from the Facts and Rules in its database.

### Exactly Corresponding to my Truth Predicate Axioms

- (1) True(x)  $\leftrightarrow$  (x) // A set of facts adds up to X being TRUE.
- (2) False(x)  $\leftrightarrow$  ( $\vdash \sim$ x) // A set of facts adds up to X being FALSE.
- (3)  $\sim$ True(x)  $\leftrightarrow$   $\sim$ ( $\vdash$ x) // No set of facts add up to X being TRUE.

[http://liarparadox.org/Tarski\\_Proof\\_275\\_276.pdf](http://liarparadox.org/Tarski_Proof_275_276.pdf)

The above inference model directly refutes the third line of Tarski's proof:

(3)  $x \notin \text{Pr}$  if and only if  $x \in \text{Tr}$  // AKA  $\sim$ Provable(x)  $\leftrightarrow$  True(x)

Because the Prolog inference model defines True(x)  $\leftrightarrow$  Provable(x) this directly contradicts the third line of Tarski's proof shown above. Because the whole proof depends on this one line proving this one line is false causes the rest of the proof to fail.

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