On the Nature of Gödel’s Second Incompleteness Theorem

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Gödel’s “Second” Incompleteness Theorem states that axiom systems of sufficiently great strength are unable to formally verify their own consistency. Let $A(x, y, z)$ denote a 3-way predicate relation indicating that $x + y = z$, and let $M(x, y, z)$ indicate that $x \cdot y = z$. Let us say an axiom system $\alpha$ recognizes addition and multiplication as “Total” functions iff it can prove:

$$\forall x \forall y \exists z \ A(x, y, z) \ \text{AND} \ \forall x \forall y \exists z \ M(x, y, z).$$

(1)

In several recent articles, we have shown how such totality conditions are related to both generalizations and boundary-case style exceptions for Gödel’s Second Incompleteness Theorem. This talk will survey several of our most recently published results [1, 2, 3, 4, 5, 6, 7] about this subject.

References


