

Incompleteness via paradox (and completeness)

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This talk will explore a method for uniformly transforming the paradoxes of naive set theory and semantics into formal incompleteness results originally due to Georg Kreisel and Hao Wang. I will first trace the origins of this method in relation to Gödel's proof of the completeness theorem for first-order logic and its subsequent arithmetization by Hilbert and Bernays in their *Grundlagen der Mathematik*. I will then describe how the method can be applied to construct arithmetical statements formally independent of systems of set theory and second-order arithmetic via formalizations of Russell's paradox and the Liar (and time permitting also the Skolem and Richard paradoxes). Finally, I will consider the significance of these results relative to both the Hilbert program and subsequent work in predicative mathematics.