

On generalized Goodstein sequences

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The termination property of the classical Goodstein sequences provides a simple number-theoretic assertion which is true but independent of first order Peano arithmetic PA.

In this talk we consider Goodstein sequences which are defined relative to Ackermannian functions. We discuss the following two results.

Theorem A. When the zero-th branch of the Ackermann function is the successor function then the induced Goodstein principle will be equivalent to the one consistency of PA.

Theorem B. When the zero-th branch of the Ackermann function is an exponential function $k \mapsto k^b$ then the induced Goodstein principle will be equivalent to the one consistency of ATR_0 .

(Theorem B is joint work with Toshiyasu Arai and Stan Wainer). If time is left we consider the strength of Goodstein principles relative to the fast growing Schwichtenberg Wainer hierarchy.

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