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TANNENBAUM PHENOMENA FOR BOUNDED EXISTENTIAL FUNCTION

I will present some new results concerning the Tennenbaum phenomena of the weak theory of first-order arithmetic IE_1 of *bounded existential induction* introduced by George Wilmers, and of finite subtheories of IE_1.

In particular I will present a simplification of the proof of Wilmers' main theorem that all nonstandard models M of IE_1 have reducts $M \mid +$ that are recursively saturated models of Presburger arithmetic (and hence these countable reducts are exactly the reduces $M' \mid +$ where M' satisfies PA). This simplification will enable me to analyze in more detail the status of a problem posed by Wilmers' (whether his theorem holds for some finite fragment of IE_1) and relate this question to problems in diophantine complexity.

I shall also investigate the Tennenbaum properties of e.c. models of certain finite fragments of IE_1, showing that these satisfy overspill for $\exists_1$ formulas, and have nonstandard initial segments satisfying PA. As corollary I will deduce that Hilbert's 10th problem for IE_1 (to give a procedure to decide which diophantine equations have a solution in some model of IE_1) is actually insoluble.

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