Wolfgang Thomas (RWTH Aachen). The ordering of natural numbers with a unary predicate: Approaches to show decidability results.

The subject of this talk are structures (N,<,P) where P is a set of natural numbers. Since the 1960's, following Büchi's theorem that the monadic second-order theory of (N,<) is decidable, many authors have studied the question which sets P can be adjoined to (N,<) without destroying this decidability result. For numerous predicates this can be shown (e.g., for the set of factorial numbers), in interesting cases (in particular, for the set of prime numbers) this is open, and so far no interesting P is known where the MSO-theory of (N,<,P) is undecidable. We give an overview of the area, addressing the recursion theoretic status of the MSO-theory of a structure (N,<,P), the approaches using automata, semigroups, and logical composition results for showing decidability, and we present a recent study of the problem using the concept of uniformly homogeneous set (joint work with Alexander Rabinovich).