Decidable Extensions of MSO

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───── **Abstract** ─────

This is an overview of the invited talk delivered at the 41st International Symposium on Mathematical Foundations of Computer Science (MFCS-2016).

1   Overview of the Talk

Büchi's theorem says that it is decidable if a formula of MSO (monadic second-order logic) can be satisfied in an infinite word. Rabin generalised this to infinite trees. These are among the most powerful decidability results in computer science, and many other decidability results can be obtained as corollaries. In my talk, I will discuss how to go beyond these results and what features can be added to MSO so that it remains decidable. The added feature are going to be extra quantifiers, like the "unboundedness" quantifier or a probabilistic "almost surely" quantifier.

In the proofs of Büchi's and Rabin's theorems, the key role is played by automata. In the extensions from my talk, this will also be the case. The automata are going to be nondeterministic devices with new asymptotic acceptance conditions, which go beyond the classical Büchi or parity acceptance conditions.