1103-05-33 **Jeffrey Shallit*** (shallit@cs.uwaterloo.ca), School of Computer Science, University of Waterloo, 200 University Ave. W., Waterloo, Ontario N2L 3G1, Canada. *New Results On Infinite Words Obtained with an Automatic Prover.*

In this talk I'll survey some results results we recently obtained with an automatic prover written by my student Hamoon Mousavi. This software package, written in Java, takes as input an automaton $M$ specifying an infinite word $\mathbf{x}$ and a predicate $P(n)$ (expressed in a logical language) about the factors of $\mathbf{x}$, and returns an automaton accepting the representation of those $n$ for which the predicate holds. Depending on the size of the initial automaton $M$, the type of representation (base-$k$ for $k \geq 2$; Fibonacci representation; Tribonacci representation), and the complexity of the predicate, many nontrivial assertions can be proven mechanically in a few seconds or minutes.

As an example, we used this prover to show the existence of an aperiodic infinite binary word avoiding the pattern $xxx^R$ and infinitely many distinct primitive words $t$ such that $t^\omega = ttt\cdots$ avoids the same pattern.

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