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Decidable properties of automatic sequences

We discuss some decidable properties of automatic sequences. An automatic sequence is a sequence generated by first iterating a uniform substitution and then possibly relabelling some of the alphabet symbols. In 1986, Honkala showed that the problem of determining if an automatic sequence is ultimately periodic is algorithmically decidable. Several different proofs of this result have been given since then, including one by Allouche, Rampersad, and Shallit. In fact, the approach proposed by Allouche et al. can be presented in a more general framework based on a logical characterization of automatic sequences. This approach allows one to show very easily that certain properties (those expressible in a certain formal logic) of automatic sequences are algorithmically decidable. Such properties include periodicity, squarefreeness, recurrence, and many others. This is joint work with Emilie Charlier and Jeffrey Shallit.