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Algorithmic aspects of self-similar groups

We will discuss algorithmic problems from the theory of self-similar groups and Thurston maps (post-critically finite branched coverings of the sphere). For instance, we will study the problem of deciding when a given Thurston map is equivalent to a rational function and when two Thurston maps are combinatorially equivalent. Both these problems can be expressed in algebraic terms as questions about the corresponding iterated monodromy groups, which are groups generated by automata.