1046-20-682   **Jane Gilman*** (`gilman@andromeda.rutgers.edu`), Mathematics Department, Rutgers University, Newark, NJ 07102, and **Linda Keen** (`LINDA.KEEN@lehman.cuny.edu`). *Palindromes and Discreteness Algorithms.*

Palindromes play an essential role in the discreteness algorithm for Fuchsian groups. It is well known that every primitive element of the free group on two generators is conjugate to either a palindrome in the generators or the product of two palindromes. The $PSL(2, \mathbb{R})$ discreteness algorithm determines whether or not a two generator non-elementary subgroup is discrete. If it is discrete, it is a Fuchsian group and the quotient of the upper-half-plane under its action is a Riemann surface of finite type. The discreteness algorithm runs through a series of words in the generators that are palindromes or products of two. Similarly, an algorithmic component of the $PSL(2, \mathbb{C})$ representation space will use a sequence of palindromes and products of two. We discuss the geometry of palindromes in the action of a two-generator group on hyperbolic three-space. We give a new iteration scheme for primitive elements of a free group in which the elements are either palindromes or the product of two palindromes (i.e. not simply conjugate to such) and obtain a discreteness condition for representations into $PSL(2, \mathbb{C})$ which gives insight into the algorithmic component of the representation space for three manifold and orbifold groups. (Received September 10, 2008)

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