Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5)
Vol. VI (2007), 405-440

Combinatorial mapping-torus, branched surfaces and free group automorphisms

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Abstract. We give a characterization of the geometric automorphisms in a certain class of (not necessarily irreducible) free group automorphisms. When the automorphism is geometric, then it is induced by a pseudo-Anosov homeomorphism without interior singularities. An outer free group automorphism is given by a 1-cocycle of a 2-complex (a standard dynamical branched surface, see [7] and [9]) the fundamental group of which is the mapping-torus group of the automorphism. A combinatorial construction elucidates the link between this new representation (first introduced in [16]) and the classical representation of a free group automorphism by a graph-map [2].

Mathematics Subject Classification (2000): 20E05, 57M20, 37Bxx, 37E25.