Turkish Journal of Mathematics

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On cofinite subgroups of mapping class groups

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Abstract: For every positive integer n, we exhibit a cofinite subgroup Γ_n of the mapping class group of a surface of genus at most two such that Γ_n admits an epimorphism onto a free group of rank n. We conclude that $H^1(\Gamma_n; \mathbb{Z})$ has rank at least n and the dimension of the second bounded cohomology of each of these mapping class groups is the cardinality of the continuum. In the case of genus two, the groups Γ_n can be chosen not to contain the Torelli group. Similarly for hyperelliptic mapping class groups. We also exhibit an automorphism of a subgroup of finite index in the mapping class group of a sphere with four punctures (or a torus) such that it is not the restriction of an endomorphism of the whole group.