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Abelian subgroup separability of Haken 3-manifolds and closed hyperbolic n -orbifolds. (English)

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The author proves that, if the group G is the fundamental group of a Haken 3-manifold or the fundamental orbifold group of a closed hyperbolic orbifold of any dimension, then the Abelian subgroups of G are separable in G ; that is, given any Abelian subgroup H of G and given any element $g \in G \setminus H$, there is a subgroup K of G which has finite index in G , and which contains H but does not contain g .

In the 3-manifold case, the proof follows the outline of the proof that groups of Haken 3-manifolds are residually finite: (1) reduce to the case of a closed Haken 3-manifold; (2) apply the Jaco-Shalen-Johannson decomposition theorem; (3) apply known results for Seifert-fibered spaces and hyperbolic 3-manifolds; (4) carefully piece these results together.

In the general hyperbolic case, apply Selberg's lemma, Mostow rigidity, and analyse the trace field associated with a representation from G into $\mathrm{SO}(1, n; R)$ by matrix and number theoretic methods.

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