Zentralblatt–MATH

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A non-residually finite square of finite groups. (English)

Campbell, C. M. (ed.) et al., Groups St. Andrews 1997 in Bath. Selected papers of the international conference, Bath, UK, July 26-August 9, 1997. Vol. 1. Cambridge: Cambridge University Press. Lond. Math. Soc. Lect. Note Ser. 260, 368-378 (1999). [ISBN 0-521-65588-9/pbk; ISSN 0076-0552]

A triangle T of groups is a diagram of groups. The fundamental group of T, or $\pi_1(T)$, is the group given by the presentation whose generators are the elements of X, Y, Z and whose relators are the multiplication tables for X, Y, Z, and the relations induced by the inclusions in the diagram. It is natural to ask: Which finiteness properties does the fundamental group of a non-positively curved polygon of finite groups have? For instance, is such a group residually finite, or virtually torsion-free?

Theorem 1.1. There exists a non-positively curved square of groups whose vertex groups have orders 288, 288, 576, and 576, and whose fundamental group is non-residually finite.

A combinatorial 2-complex Y whose 2-cells are squares is said to be a complete squared complex (CSC) if the link of each vertex of Y is a complete bipartite graph.

Theorem 2.2. Let Y be a squared 2-complex, and let $\widetilde{Y}$ denote the universal cover of Y. Then Y is a CSC if and only if $\widetilde{Y}$ is isomorphic to the direct product of two trees.

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