Mathematics > Group Theory

Detecting ends of residually finite groups in profinite completions

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Let $\C$ be a variety of finite groups. We use profinite Bass--Serre theory to show that if $u:H\hookrightarrow G$ is a map of finitely generated residually $\C$ groups such that the induced map $\hat{u}:\hat{H}\rightarrow\hat{G}$ is a surjection of the pro-$\C$ completions, and G has more than one end, then H has the same number of ends as G. However if G has one end the number of ends of H may be larger; we observe cases where this occurs for $\C$ the class of finite p-groups.
We produce a monomorphism of groups $u:H\hookrightarrow G$ such that: either G is hyperbolic but not residually finite; or $\hat{u}:\hat{H}\rightarrow\hat{G}$ is an isomorphism of profinite completions but H has property (T) (and hence (FA)), but G has neither. Either possibility would give new examples of pathological finitely generated groups.

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