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Self-similar groups acting essentially freely on the boundary of a rooted tree

We give a complete classification of self-similar groups generated by 3-state automata over 2-letter alphabet that act essentially freely on the boundary of the binary tree. In my talk, I will give a motivation for our study and concentrate on 2 most interesting new examples that has not been studied before. One of these groups is isomorphic to an extension of the rank 2 lamplighter group by the group of order 2. This group rather surprisingly has a subgroup of infinite index, whose closure has index 2 in the closure of the whole group. The other group is a metabelian group whose commutator subgroup is isomorphic to an additive group $\mathbb{Z}[\frac{1}{3}]$ of all rational numbers whose denominators are powers of 3. We also describe presentations of these groups. This is a joint work with Rostislav Grigorchuk.