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A CONSTRUCTIVE PROOF THAT THE HANOI TOWERS GROUP HAS NON-TRIVIAL RIGID KERNEL

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Abstract. In 2012, Bartholdi, Siegenthaler, and Zalesskii computed the rigid kernel for the only known group for which it is non-trivial, the Hanoi towers group. There they determined the kernel was the Klein four-group. In this note, we present a simpler proof of this theorem. In the course of the proof, we also compute the rigid stabilizers and present proofs that this group is a self-similar, self-replicating, regular branch group.

1. Introduction

Since the construction of the first Grigorchuk group in 1980, the study of branch groups has developed into an important area in group theory. Branch groups derive their value from the unusual properties that groups in this class can exhibit. Amenable but not elementary amenable groups, groups of finite width, groups with intermediate growth, and finitely generated infinite torsion groups are a few of the types that can arise. As a result, these groups have been heavily studied in recent years [1].

Showing that these groups have interesting properties and understanding why are equally important tasks as the latter can be used to gain a deeper understanding of these groups and eventually used to construct groups with additional noteworthy properties. For this reason, constructive proofs using the underlying geometry and properties of the group as opposed to more abstract techniques are essential.

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