1. Introduction

1.1. It is one of the most important problems in the theory of Kleinian groups to decide whether or not a subgroup \( G \) of the Möbius transformation group is discrete. For this problem there are two important and useful theorems: One is Poincaré’s polyhedron theorem, which gives a sufficient condition for \( G \) to be discrete. The other is Jørgensen’s inequality, which gives a necessary condition for a two-generator Möbius transformation group \( \langle A, B \rangle \) to be discrete. Here we will consider extreme discrete groups (Jørgensen groups) for Jørgensen’s inequality. This paper is the second part of a series of studies on Jørgensen groups (cf. Li-Oichi-Sato [4, 5]).

1.2. Let Möb denote the set of all linear fractional transformations (Möbius transformations)

\[
A(z) = \frac{az + b}{cz + d}
\]

of the extended complex plane \( \hat{\mathbb{C}} = \mathbb{C} \cup \{\infty\} \), where \( a, b, c, d \) are complex numbers and the determinant \( ad - bc = 1 \). There is an isomorphism between Möb and \( \text{PSL}(2, \mathbb{C}) \). We always write elements of Möb as matrices with determinant 1 in this paper. We recall that Möb (= \( \text{PSL}(2, \mathbb{C}) \)) acts on the upper half space \( \mathbb{H}^3 \) of \( \mathbb{R}^3 \) as the group of conformal isometries of hyperbolic 3-space.

In this paper we use a Kleinian group in the same meaning as a discrete group. Namely, a Kleinian group is a discrete subgroup of Möb. A Kleinian group \( G \) is of the first kind if the limit set \( \Lambda(G) \) of \( G \) is all of the extended complex plane \( \hat{\mathbb{C}} \) and it is of the second kind otherwise. A subgroup \( G \) of Möb is said to be elementary if there exists a finite \( G \)-orbit in \( \mathbb{R}^3 \).