A remark on Z-orientability of Kleinian groups

Expositor: Juan Carlos García Navas (Universidad de La Frontera, jcgn70@gmail.com)
Autor/es: Juan Carlos García Navas (Universidad de La Frontera, jcgn70@gmail.com)

The notion of Z-orientability for 2-cell decompositions of a closed Riemann surface was considered by Zapponi to decide if a given Strebel quadratic form has square roots. He also used this notion in the setting of dessins d'enfants to obtain certain unicellular dessins d'enfants in genus zero (a generalization of Leila's flowers) with the property that such a family is Galois-invariant and it contains at least two Galois orbits. Recently, it has been proved that Z-orientability provides a new Galois invariant for dessins d'enfants.

We show how to extend this notion for general Kleinian groups in any dimension. As an application, this notion is used to provide a necessary and sufficient geometrical condition for a non-constant surjective meromorphic map $\varphi : S \to \widehat{\mathbb{C}}$, where S is a connected Riemann surface, to admit an square root, that is, a meromorphic map $\psi : S \to \widehat{\mathbb{C}}$ such that $\varphi = \psi^2$. We also extend this idea to obtain a necessary and sufficient geometrical condition for a non-constant surjective meromorphic map φ to admit an n-root, that is, a meromorphic map $\psi : S \to \widehat{\mathbb{C}}$ such that $\varphi = \psi^n$.