

Geometric Group Theory/Théorie géométrique des groupes

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• SHORT TALKS •

The complexity of braids and the geometry of Teichmueller space

Bertold Wiest

`bertold.wiest@math.univ-rennes1.fr`

IRMAR

Université Rennes 1

Campus de Beaulieu

Rennes, BZH 35042

FRANCE

Abstract

We define a measure of “complexity” of a braid which is natural with respect to both an algebraic and a geometric point of view. Algebraically, we modify the standard notion of the length of a braid by introducing generators Δ_{ij} , which are Garside-like half-twists involving strings i through j , and by counting powered generators Δ_{ij}^k as $\log(|k| + 1)$ instead of simply $|k|$. The geometrical complexity is some natural measure of the amount of distortion of the n times punctured disk caused by a homeomorphism. Our main result is that the two notions of complexity are comparable. This gives rise to a new combinatorial model for the Teichmueller space of an $n + 1$ times punctured sphere. The key role in the proofs is played by a technique introduced by Agol, Hass, and Thurston.