GEOMETRIC REPRESENTATIONS OF THE BRAID GROUP

JONAS TREPIAKAS

Abstract. The mapping class group of a surface S is the group of isotopy classes of automorphisms of S. More precisely, it is defined as $\mathrm{MCG}(S) := \pi_0\left(\mathrm{Homeo}^+(S, \partial S)\right)$ where $\mathrm{Homeo}^+(S, \partial)$ is the group of self-homeomorphisms of S fixing the boundary pointwise, equipped with a suitable topology.
We will look at certain connections between mapping class groups and braid groups. The braid group on n strands, $\mathcal{B}_n$, is the group of isotopy classes of braids on n strands. See figure 1.

The goal of the lecture will be to understand the basic structure of these groups as well as geometric representations of the braid group, which are group homomorphisms $\mathcal{B}_n \to \mathrm{MCG}(S)$ for some surface S.

We will also see how geometric representations fit into a categorical framework which turns out to be the same one needed in the study of homological stability.

There are no prerequisites for most of this talk as the subject will be treated informally.

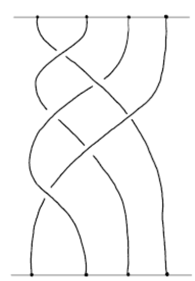

Figure 1. Example of a braid