On the different flavours of Lawrence-Bigelow representations

Martin Palmer-Anghel // Moscow-Beijing topology seminar // 2 December 2020

Abstract.

The family of *Lawrence-Bigelow representations* of the braid groups are of central importance in the study of the braid groups themselves, as well as their connections with quantum invariants of knots and links. They are an example of a wider class of homological representations of mapping class groups of surfaces, arising from twisted homology of configuration spaces. These homological representations come in many different flavours, depending on the kind of homology theory used, whether we forget part of the boundary or consider homology relative to part of the boundary, and whether we consider twisted homology or instead the homology of an associated covering space.

We will describe these different constructions of homological representations, and then explain the fundamental relationships between them in terms of non-degenerate pairings, embeddings and isomorphisms. In many cases, the representations are free (as modules), and we will also describe, pictorially, explicit bases for these representations.

This represents joint work with Cristina Anghel and is based on `arxiv:2011.02388`.