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Equivariant motion planning

Consider the space X of all possible configurations of a mechanical system. A motion planning algorithm assigns to each pair of initial and final states $(a, b) \in X \times X$, a continuous motion of the system starting at a and ending at b.

Topological complexity is an integer $TC(X)$ reflecting the complexity of motion planning algorithms for all systems having X as their configuration space. Roughly, $TC(X)$ is the minimal number of continuous rules which are needed in a motion planning algorithm. This invariant was introduced by Farber in 2002 and is closely related to the classical Lusternik-Schnirelmann category.

In recent years, several versions of topological complexity aimed at exploiting the presence of a group G acting on the configuration space have appeared. We will present several approaches to describing equivariant topological complexity variants in the context of the bicategory of orbifold translation groupoids and will show that $TC^G(X)$ is invariant under Morita equivalence.