

TOPOLOGICAL COMPLEXITY OF MOTION PLANNING

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Abstract: About ten years ago, Michael Farber defined an invariant of topological spaces that he called topological complexity of motion planning (TC). The invariant is a specialization of Schwarz's genus and has the extra property of being homotopy invariant. If the space is the configuration space of a mechanical system then its TC coincides with the minimal number of local rules in any motion planning algorithm for the system.

In the talk, we will define TC, discuss its properties, and survey recent results of computations of TC. For instance, for a real projective plane X of a dimension different from 1, 3, and 7, $TC(X)$ is the smallest number k such that X admits an immersion in the Euclidean space of dimension $k - 1$.