Sequential topological complexity of aspherical spaces and sectional categories of subgroup inclusions

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The sequential topological complexities (TCs) of a topological space are homotopy invariants that measure the instability of the motion planning problem from robotics (specifically when we consider a robot visiting several pre-determined intermediate points along its way from start to end point). One of the most important open problems on the field is the characterization, on purely algebraic terms, of the (sequential) topological complexity of aspherical spaces. A possible approach to this problem is through the study of the sectional categories of subgroup inclusions, as natural generalizations of sequential TCs for this algebraic setting.

We will show how to obtain new lower bounds for sectional categories of subgroup inclusions through homological algebra methods, and discuss their consequences for sequential TCs of aspherical spaces and parametrized TC of group epimorphisms. If time permits, we will also mention how some of our methods allow to obtain results on spaces that are not necessarily aspherical.

This is joint work with Michael Farber, Stephan Mescher and John Oprea.