

Topological Complexity

The goal of this project is to study numerical homotopy invariants called the higher topological complexity $TC_n(X)$ of a topological space X for $n \geq 2$. We begin by introducing the notion of Schwarz genus of a surjective fibration which provides us insights for understanding the numerical homotopy invariants - Lusternik-Schnirelmann (LS) category and higher topological complexity of spaces as both of them are the Schwarz genus of specific path space fibrations. We further explore the LS category of a space and study its bounds, since for any fibration $p : E \rightarrow B$ the Schwarz genus of p is bounded above by the LS category of the base space B . In particular, $TC_n(X)$ is bounded above by the LS category of the base space of the corresponding path space fibration. We then implement the results associated with the Schwarz genus and LS category to study the higher topological complexity comprehensively.