ON SOME APPROACHES OF TOPOLOGICAL COMPLEXITY.

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Abstract.

The topological complexity of a space X, $\mathrm{TC}(X)$, is the sectional category (or Schwarz genus) of the end-points evaluation fibration $\pi_X : X^I \to X \times X$, $\pi_X(\alpha) = (\alpha(0), \alpha(1))$. This homotopical invariant was defined by M. Farber in order to give a topological approach to the motion planning problem in robotics. If one regards the topological space X as the configuration space of a mechanical system, the motion planning problem consists of constructing a program which takes pairs of configurations $(A, B) \in X \times X$ as an input and produces as an output a continuous path in X which starts at A and ends at B. Broadly speaking, $\mathrm{TC}(X)$ measures the discontinuity of any motion planner in the space.

In this talk I will explain the use of certain approaches of the topological complexity of a space X and see how they are related. Among such approaches we can mention $\mathrm{wTC}(X)$ the weak topological complexity, $\mathrm{cat}(C_\Delta)$ the Lusternik-Schnirelmann category of the homotopy cofibre of the diagonal map $\Delta : X \to X \times X$, or $\mathrm{TC}^M(X)$ the monoidal topological complexity of X.