Variations on Topological Complexity

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We give a succinct introduction to Farber's topological complexity. This number is a homotopy invariant which reflects the complexity of the problem of constructing a motion planning algorithm in the configuration space of a mechanical system. We introduce a groupoid invariant carrying an interpretation in terms of the motion planning problem for a robot when its configuration space exhibits symmetries. This number is an interesting invariant in itself to measure the complexity of motion planning algorithms in situations that might be modeled by a group action. In particular it could provide a model for the planning of a robot transporting itself by means of two different types of motions. For example, a model for a robot traveling in the physical space by guided tracks and/or air transportation. This is joint work with Andres Angel.

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