Seminarium geometrów

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Equivariant topological complexity of smooth $\mathbb{Z}/p$-spheres

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Abstract: The motion planning problem in the configuration space X of a mechanical system consists of describing a continuous algorithm which, given a pair $(x, y) \in X \times X$, outputs a continuous path in X between x and y. In order to measure discontinuity of the process of motion planning, M. Farber introduced the notion of topological complexity of X. Due to its applications in topological robotics and close relationship with Lusternik–Schnirelmann category, topological complexity has enjoyed much attention in recent literature. In particular, there appeared its versions aimed at exploiting the presence of a group action: equivariant topological complexity (TC_G) and invariant topological complexity (TC^G).

During the course of the talk I will review the relevant definitions, briefly compare the two notions – their founding ideas are quite different – and then report on joint work with M. Kaluba on computation of both invariants for spheres equipped with smooth $\mathbb{Z}/p$-actions. Most notably, I will explain how TC_G and TC^G are either 2 or 3 when the action is semilinear, and exibit examples which show that this is no longer true for a typical smooth $\mathbb{Z}/p$-sphere.