

Topology Seminar

Jonathan Campbell

of Center for Communications Research La Jolla will be speaking on

Homotopy Theory and Hilbert's Third Problem

on October 5 at 4:30 in
MIT Room Zoom

In this talk I'll explain how one might attack Hilbert's Generalized Third Problem via homotopy theory, and describe recent progress in this direction. Two n -dimensional polytopes, P , Q are said to be scissors congruent if one can cut P along a finite number of hyperplanes, and re-assemble the pieces into Q . The scissors congruence problem, aka Hilbert's Generalized Third Problem, asks: when can we do this? What obstructs this? In two dimensions, two polygons are scissors congruent if and only if they have the same area. In three dimensions, there is volume and another invariant, the Dehn Invariant. In higher dimensions, very little is known — but the problem is known to have deep connections to motives, values of zeta functions, the weight filtration in algebraic K-theory, and regulator maps. I'll give a leisurely introduction to this very classical problem, and explain some new results obtained via homotopy theoretic techniques. This is all joint with Inna Zakharevich.

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