Representation stability in configuration spaces via Whitney homology of the partition lattice

Patricia Hersh, North Carolina State University

In recent years, important families of symmetric group representations have come to be better understood through the perspective of representation stability, a viewpoint introduced and developed by Thomas Church, Jordan Eilenberg, and Benson Farb, among others. A fundamental example of representation stability is the S_n-module structure for the i-th cohomology of the configuration space of n distinct, labeled points in the plane, or more generally in a connected, orientable manifold. For the plane, this translates to Whitney homology of the partition lattice via an S_n-equivariant version of the Goresky-MacPherson formula. This talk will survey the combinatorial literature regarding the partition lattice and discuss what new things this can tell us about representation stability for configuration spaces. We will also discuss related conjectures of John Wiltshire-Gordon that have indeed been proven.

This is a joint work with Vic Reiner.