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A Geometric Algorithm for Computing Zelevinsky Standard Representations.

The p-adic Khazdhan Lusztig Hypothesis (pKLH) can be described as a relation between multiplicities of representation theoretic objects and dimensions of algebro-geometric objects. Explicitly, the pKLH translates between the Grothendieck group change of basis matrix—which sends Zelevinsky standard representations to irreducible representations—and the stalk table for certain intersection cohomology complexes on a moduli space of Langlands parameters. This relation allows for the structure of Zelevinsky standard representations to be parsed using algebro-geometric tools applied to the well-studied moduli spaces of Langlands parameters known as Vogan varieties. In this talk I will sketch an algorithm for computing the stalks of intersection cohomology complexes attached to trivial local systems which are supported on orbit closures in a given Vogan variety. Currently the algorithm is restricted to the case of $\mathrm{GL}_n(F)$ due to the simple perverse sheaves in this case being characterized by these intersection cohomology complexes for trivial local systems. Nonetheless, this algorithm has shown success for certain infinite families of Vogan varieties, which are classified by appropriate infinitesimal parameters. Once computed, the stalks of the intersection cohomology complexes can be translated back into the decompositions of Zelevinsky standard representations in terms of irreducible representations, assuming the pKLH. Throughout the talk I will provide select examples to elucidate the primary ideas and methods used in the algorithm.