Abstract

A sequence of $S_n$-representations $\{V_n\}$ is said to be uniformly representation stable if the decomposition of $V_n = \bigoplus \lambda c_{\lambda,n} V(\lambda)_n$ into irreducible representations can be described independently of $n$ for each $\lambda$—that is, the multiplicities $c_{\lambda,n}$ are eventually independent of $n$ for each $\lambda$. It is known that uniform representation stability holds for the cohomology of flag varieties (the so-called diagonal coinvariant algebra), a well-known Springer representation. But does it hold for all Springer representations? In this talk we explore this question. Central to this exploration is the co-FI-module structure (in the sense of Church-Ellenberg-Farb) of a sequence of cohomology rings of Springer varieties parametrized by partitions of $n$. Lastly we explore some combinatorial consequences of the stability of the Springer representation. This part of the talk will include some conjectures that we have yet to prove but will provide convincing evidence that they indeed hold.