On the geometry of regular Hessenberg varieties

Haozhi Zeng *(Fudan University),*
zenghaozhi@fudan.edu.cn

Regular Hessenberg varieties are a family of subvarieties of the full flag variety G/B. This family contains the full flag variety, Peterson variety and perutohedral variety. This subject makes connections between representation theory, combinatorics, algebraic geometry and algebraic topology. In this talk we discuss the cohomology groups of structure sheaves on regular Hessenberg varieties and the degree of regular Hessenberg varieties under their Kodaira embeddings.

Theorem 1 *Let $X = Hess(\mathcal{A}, h)$ be a regular Hessenberg variety and $h(i) \geq (i+1)$ for $1 \leq i \leq n-1$. Then*

$$H^i(X, \mathcal{O}_X) = 0, \quad \forall i \geq 1.$$

Theorem 2 *Let λ be a regular dominat weight and assume that $h(i) \geq (i+1)$ for $1 \leq i \leq n-1$. Then the Hilbert polynomial of the embedding $Hess(\mathcal{A}, h) \hookrightarrow \mathbb{P}(V_\lambda)$ does not depend on the regular matrix $\mathcal{A}$.*

This is a joint work with Hiraku Abe and Naoki Fujita.

References

[1] H. Abe, N. Fujita, H. Zeng, *Geometry of regular Hessenberg varieties*, arXiv:1712.09269.