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Associated varieties of fundamental series representations

Abstract

A basic problem in representation theory is to understand the restriction of a representation of a big group G to a subgroup K . I'll talk about the case when G is a real reductive Lie group and K is a maximal compact subgroup. To each irreducible representation X of G there is attached a complex algebraic variety $AV(X)$ (the *associated variety*) on which K acts. There are only finitely many possibilities for $AV(X)$; in the case of $GL(n, \mathbb{C})$, for example, $AV(X)$ must be the closure of a conjugacy class of nilpotent matrices.

What happens is that X restricted to K is approximately equal to the action of K on regular functions on $AV(X)$. Computing $AV(X)$ is therefore an approximate computation of X restricted to K .

I'll talk about some recent results of Ben Harris on the geometric nature of $AV(X)$, and illustrate with some computations of associated varieties for the split real form of E_8 .