

The 18th Takagi Lectures

November 5, 2016 (Sat) 17:00–18:00

November 6, 2016 (Sun) 14:00–15:00

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The Size of Infinite-Dimensional Representations

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Abstract

The simplest geometric invariant of a differential equation $Df = 0$ is its characteristic variety: the collection of zeros (in the cotangent bundle) of the principal symbol of D . This invariant carries over to the theory of \mathcal{D} -modules: a \mathcal{D} -module \mathcal{M} on a manifold X has a characteristic variety $\text{Ch}(\mathcal{M}) \subset T^*(X)$.

The beautiful and sophisticated extension of the Riemann–Hilbert correspondence to (regular holonomic) \mathcal{D} -modules relates them to perverse sheaves on X , and provides powerful techniques for computing these perverse sheaves. But the much more elementary invariant $\text{Ch}(\mathcal{M})$ remains difficult or impossible to compute in important examples (like Schubert varieties).

I will discuss the (classical) representation-theoretic incarnations of these ideas, and recent work offering ways to compute something like characteristic cycles.