Families of foliations
and varieties of complexes

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We consider differential 1-forms on the complex projective space of dimension $r$, with homogeneous polynomials of degree $d$ as coefficients, and satisfying the Frobenius integrability condition. The set of all such 1-forms is an algebraic variety, denoted $F(r, d)$. One open problem in this area is to find the irreducible components of $F(r, d)$. In the first part of the talk we plan to describe some of the known irreducible components.

Afterwards, we'll discuss a strategy for approaching the problem, via the varieties of complexes. More precisely: let $V$ be a finite dimensional graded vector space and denote by $C(V)$ the corresponding variety of differential complexes, that is, the set of linear endomorphisms of $V$, of degree one and square zero. We shall review some of the basic geometry of the algebraic variety $C(V)$, including the description of its singular points and irreducible components. Then, we represent $F(r, d)$ as a linear section of a certain $C(V)$, and discuss possible consequences for the problem of enumerating irreducible components of $F(r, d)$, and some generalizations.

Tuesday, April 15
4:30 – 5:30 p.m.
Harvard (SC 507)